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SUMMARY

Heat-transfer measurements were obtained on a flat plate and 17° ramp (both with and without longitudinal stringers) and attached protuberance models. The tests were conducted at the specified free-stream Mach numbers at a Reynolds number per foot of 3.0×10^{6} (Reynolds number per meter of 9.83×10^{6}) in a 6.0-inch-thick (0.152 meter) boundary layer. The models consisted of seven general protuberances and three specific shapes.

The magnitude of heat-transfer measurements obtained on the stringer plate was less than that obtained on the clean plate.

High heating rates were obtained in a large area upstream of the bluff protuberance; however, for the more streamlined configurations the heating rates in the nose regions were relatively much lower.

Maximum heating rates obtained on the stringer plate in the model wakes were approximately 139 percent greater than the values for the clean stringer plate. No significant effect on the plate heating rates in the model wakes was observed as a result of placing a 17° ramp downstream of the model afterbody, except when the ramp leading edge was within approximately 16 inches (0.406 meter) of the model centerbody-afterbody juncture. Wake heating rates were correlated for the general protuberances by plotting the heat-transfer coefficients as a function of the plate surface length from the model centerbody-afterbody juncture.

The heating rates obtained on the 17° ramp in the wakes of all models, except one, were approximately the same as those obtained on the 17° ramp for the clean stringer plate. The 17° ramp caused no noticeable effects on the model heating rates; this result was in agreement with results obtained from previous investigations.

INTRODUCTION

The capability of both existing and proposed launch vehicles for obtaining hypersonic flight speeds within the earth's atmosphere necessitates an accurate determination of the aerodynamic heating over the external skin. Although the magnitudes of these heating rates are much less than those occurring for reentry environments, they are large enough in some regions of the vehicle to require the addition of heat insulation material in order to keep the skin temperature within acceptable limits. Since the addition of this heat insulation material detracts from the potential payload of the vehicle, it is desirable that the heating distribution be known as accurately as possible.

Areas of potentially high heating on the Saturn V launch vehicle consist of the interference regions created by protuberances on the vehicle external surface. Unfortunately, the flow field in such regions does not readily lend itself to analytical treatment and, therefore, recourse must be made to experimental methods.

Numerous experimental investigations have been conducted to determine the aerodynamic heating in these regions for both general and specific shapes (e.g., refs. 1 to 5); however, this information was not considered sufficient for Saturn V design purposes partly because of the longitudinal stiffeners on the S-IVB surface and the various flares between stages. In order to provide the necessary design information for Saturn V, tests were conducted in the Langley Unitary Plan wind tunnel with models of the Saturn V protuberances mounted on the tunnel sidewall. Longitudinal stringers were attached to the tunnel sidewall to simulate the S-IVB stiffeners. Tests were conducted both with and without a 17° ramp, simulating the S-IVB flare, mounted on the sting support adjacent to the tunnel aft of the protuberance.

Heat-transfer measurements were obtained on a total of 10 protuberance models and on the flat-plate and ramp surfaces at Mach numbers of 2.49, 3.51, and 4.44 and at a Reynolds number per foot of 3.0×10^6 (Reynolds number per meter of 9.83×10^6) in a 6.0-inch-thick (0.152 meter) boundary layer. (Factors for converting the units used in this report from the U.S. Customary System to the International System (SI) are given in ref. 6.)

SYMBOLS

b local skin thickness

c specific heat of model skin

h heat-transfer coefficient (subscript within parentheses used with h refers to configuration number)

k	coefficient of thermal conductivity
M	free-stream Mach number
p_t	stagnation pressure
t	time
T	temperature
T_e	measured wall temperature at steady-state conditions
T_t	stagnation temperature
T_w	wall temperature
T_{aw}	adiabatic wall temperature
x	surface distance along flat-plate longitudinal axis, measured from model attach point
x_m	surface distance along model longitudinal axis, measured from model attach point (see fig. 18)
x_r	surface distance along ramp longitudinal axis, measured from ramp leading edge
x_s	surface distance along flat-plate longitudinal axis, measured from model afterbody shoulder to ramp leading edge
x'	surface distance along flat-plate longitudinal axis, measured from model afterbody shoulder
y	surface distance perpendicular to longitudinal axis of flat plate or ramp
z	perpendicular distance from flat-plate or ramp surface
ρ	density of model skin

Subscripts:

0,1,2,. . .,n	time sequence

Configuration component designations:

M	protuberance model (subscript with M refers to model number)
P_1	flat plate without stringers
P_2	flat plate with stringers
R_1	ramp without stringers
R_2	ramp with stringers

The component composition of the various configurations is given in table I.

APPARATUS

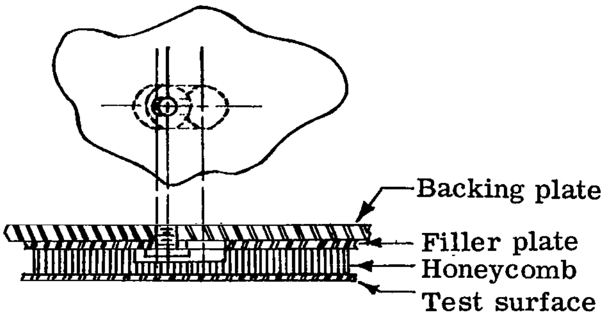
Wind Tunnel

The investigation was conducted in the high Mach number test section of the Langley Unitary Plan wind tunnel, described in reference 7. This variable-pressure, continuous-flow tunnel has an asymmetrical sliding-block nozzle that permits a continuous variation in the test-section Mach number from 2.30 to 4.65. The maximum deviation in Mach number over the 4- by 4-ft (1.219 by 1.219 m) test section through the range of tests is ±0.05.

Models

Flat plate.- Heat-transfer measurements were obtained at $M = 2.49$, 3.51, and 4.44 on a flat-plate test surface both with and without attached protuberance models and a 17° ramp. In order to utilize the 6.0-in. (0.152-m) boundary-layer thickness on the tunnel sidewall, the test plate was mounted on the access door of the test section flush with the sidewall. The relative location of these components is illustrated in figure 1.

The flat-plate test surface was constructed of 0.05-in-thick (0.00127 m) 310 stainless steel and was insulated from the support structure by a 0.375-in-thick (0.00952 m) hexagonal fiber-glass honeycomb, as shown in the following sketch:



Sketch 1

The honeycomb was bonded to a 0.125-in-thick (0.00318 m) stainless-steel filler plate, which was cut into 8-in-square (0.203 m) segments to alleviate thermal stresses. The test surface, honeycomb, and filler plate assembly were attached to the backing plate with a series of buttons (see sketch 1), one button being inserted through each of the 8-in-square (0.203 m) filler plate segments. The dimensions of the test surface were 60.00 in. (1.524 m) by 40.75 in. (1.035 m) with the model attach point located on the plate center line 32.00 in. (0.813 m) downstream of the plate leading edge.

For part of the test program, 20 strips of phenolic fiber glass, which are henceforth called stringers, were installed longitudinally to the test plate to simulate the external stiffeners of the S-IVB. These stringers were 0.50 in. (0.0127 m) square in cross section and extended approximately the entire length of the plate surface. The leading and trailing faces of the stringers were at an angle of 30° with the plate surface. The test plate was instrumented with thermocouples at 123 locations and the stringers at 9 locations, as shown in figure 2. The thermocouple coordinates are listed in table II.

Ramp.- The ramp, consisting of a 17° wedge simulating the interstages between S-IVB and S-II of the Saturn V vehicle, had a base height of 6.0 in. (0.152 m), length of 20.54 in. (0.522 m), and width of 36.0 in. (0.914 m). The internal construction of the ramp was identical to that of the test plate. Sixteen phenolic fiber-glass stringers having the same cross-sectional area and transverse locations as the 16 center stringers on the flat plate were installed on the ramp. The edge of the 30° beveled face of the stringers was approximately 1 in. (0.0254 m) downstream of the ramp leading edge. The ramp was mounted on the tunnel sting support to allow its removal from the test position without a tunnel shutdown. The test surface of the ramp was instrumented with thermocouples at 36 locations including 8 locations on the stringers. The thermocouple locations are shown in figure 3 and the coordinates are given in table II.

Protuberance models.- Ten protuberance models were tested; seven were considered to represent general protuberance shapes and three were specific Saturn protuberances. The general protuberance models consisted of half-cones attached to wedge-shape bases for the forebodies and afterbodies and of half-cylinders attached to rectangular-shape bases for the centerbodies. (See fig. 4.) The relative sizes and shapes of the general models are shown in figure 5. Photographs and dimensions of the models mounted on the flat-plate test surface are shown in figure 6.

The three specific Saturn configurations tested were the S-IVB auxiliary propulsion system (APS), the S-II separation splice, and the circumferential rings. The APS model (model 8, fig. 6(j)) was 33.4 in. (0.848 m) in length, 17.7 in. (0.450 m) in width, and 9.75 in. (0.248 m) in height. The front face of the model formed a 30° angle with the plate surface, and the rear face formed an 82° angle.

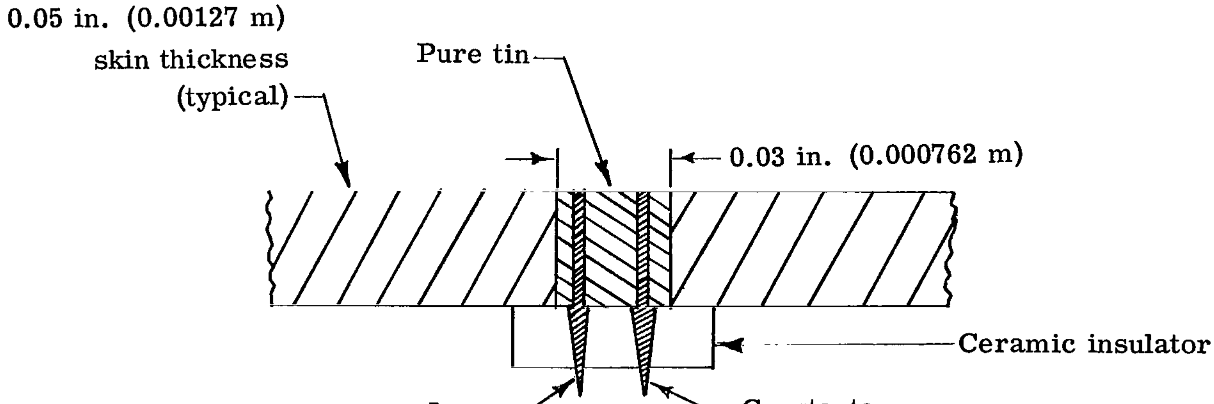
The separation splice (model 9, fig. 6(k)) was 5.07 in. (0.129 m) in length, 5.5 in. (0.140 m) in width, and 0.63 in. (0.016 m) in height (maximum). The leading and trailing faces of the model formed 14° angles with the plate surface, and the sides of the model were fitted against the second stringer from the center line of the plate, with the first stringers on either side of the center line intersecting the splice.

The circumferential rings simulated by transverse spacers (model 10, fig. 6(l)) consisted of 10 phenolic fiber-glass strips with 0.50-in-square (0.0127 m) cross sections mounted on the plate surface perpendicular to the longitudinal stringers. Eight rings were located at a longitudinal distance of 9.50 in. (0.241 m) from the leading edge of the test plate, one ring at 16.25 in. (0.413 m), and another at 20.25 in. (0.514 m).

All models, excluding model 10, were constructed of 0.040-in-thick (0.00102 m) nickel electroformed shells with thick phenolic bases for insulation purposes. The thermocouple locations on the models are shown in figure 6 and listed in table II.

Instrumentation

The thermocouple instrumentation for all models consisted of 24-gage iron-constantan wire potted with pure tin in 0.03-in-diameter (0.000762 m) holes, as shown in the following sketch:



Sketch 2

The thermocouple outputs were amplified, digitized, and magnetically recorded by a high-speed analog-to-digital data recording system. Although this system can obtain up to 40 samples a second, the outputs for this test were recorded only every 1/2 sec for 45 sec.

The tunnel free-stream static and stagnation pressures were measured on precision mercury manometers. The test-section stagnation temperature was measured with probes attached to the tunnel sidewall opposite the flat-plate surface.

TEST CONDITIONS

The tests were conducted at Mach numbers of 2.49, 3.51, and 4.44 and at a Reynolds number per foot of 3.0×10^6 (Reynolds number per meter of 9.83×10^6). During the data recording, the tunnel stagnation temperature was held constant at approximately 260° F (400° K).

DATA REDUCTION

Method of Heat-Transfer Data Reduction

Heat-transfer coefficients were obtained from measurements of transient skin temperatures resulting from a stepwise increase in stagnation temperature as discussed in reference 8. The following equation was used:

$$h = \frac{\rho bc \dfrac{dT_w}{dt}}{T_e - T_w}$$

This simplified form of the heat-balance equation was obtained by assuming constant temperature through the model skin, negligible lateral heat flow, negligible heat flow to the model interior, and no heat losses through radiation. This equation can be rearranged and written in the following form for complete machine calculation:

$$h = \frac{\rho bc\left(T_{w,n} - T_{w,0}\right)}{\frac{T_e}{T_t}\int_0^n T_t\,dt - \int_0^n T_w\,dt}$$

The value of T_e/T_t is experimentally determined prior to the temperature step and is assumed to be invariant with time. The integrals are evaluated over increments of time of 1/2 sec by use of the trapezoidal rule as follows:

$$\int_0^n T\,dt = \Delta t\left(\frac{1}{2}T_0 + \frac{1}{2}T_n + T_1 + T_2 + \ldots + T_{n-1}\right)$$

The heat-transfer coefficients corrected for lateral conduction, where sufficient instrumentation permitted (longitudinally along the flat-plate center line), are determined from the following relation:

$$h = \frac{\rho bc\left(T_{w,n} - T_{w,0}\right) - kb\int_0^n\left(\frac{\partial^2 T_w}{\partial x^2}\right)dt}{\frac{T_e}{T_t}\int_0^n T_t\,dt - \int_0^n T_w\,dt}$$

The second partial derivatives of temperature with respect to surface length are evaluated from temperature measurements at adjacent thermocouples. The corrected heat-transfer coefficients are not included herein since they were compared with the uncorrected coefficients and the difference was insignificant compared with the magnitudes of the coefficients.

Values of T_e/T_t, T_w, h, and $h/h_{(\;)}$ obtained at each Mach number are presented in tables III to V for the configurations tested.

Accuracy

The accuracy of the temperature measurements including recorder resolution, thermocouple-wire calibration, and cold junctions is $\pm 2^{\circ}$ F ($\pm 1.11^{\circ}$ K); however, this error occurs in temperature level rather than temperature fluctuations. An estimation of the accuracy of heat-transfer measurements in the Langley Unitary Plan wind tunnel has been determined by the repeatability of the data in the tests discussed in reference 9. The accuracy is dependent on the magnitude of the heat-transfer coefficient. For $h > 0.015 \frac{\text{Btu}}{\text{ft}^2\text{-sec-}^{\circ}\text{R}} \left(306 \frac{\text{J}}{\text{m}^2\text{-sec-}^{\circ}\text{K}}\right)$ the accuracy is within 10 percent, for $0.001 < h < 0.015 \frac{\text{Btu}}{\text{ft}^2\text{-sec-}^{\circ}\text{R}} \left(20 < h < 306 \frac{\text{J}}{\text{m}^2\text{-sec-}^{\circ}\text{K}}\right)$ within 15 percent, and for $h < 0.001 \frac{\text{Btu}}{\text{ft}^2\text{-sec-}^{\circ}\text{R}} \left(20 \frac{\text{J}}{\text{m}^2\text{-sec-}^{\circ}\text{K}}\right)$ within 20 percent.

Tests have been conducted utilizing a radiant heat source to estimate losses due to heat conduction from the flat-plate test surface to both the fiber-glass—laminate honeycomb and the glue line and tape bonding the stainless steel to the honeycomb. (See ref. 1.) The maximum heat loss amounted to approximately 23 percent of the radiant heat input.

RESULTS AND DISCUSSION

The measured heating rates obtained on the center line of the flat plate, with no models or stringers attached, are compared in figure 7 with theoretical estimates and with data from reference 1. These reference data were obtained along the center line of a flat-plate test surface installed at the same location on the tunnel sidewall and in the same facility as the current tests. The theoretical flat-plate estimates, calculated from reference 10, are based on the free-stream conditions of the current tests and a boundary-layer origin occurring at a point calculated by the method of reference 11 for the respective Mach numbers and a boundary-layer thickness of 6 in. (0.152 m). It should be noted that the method of reference 11 is based on adiabatic wall conditions, whereas a "cold wall" condition existed for the current tests. However, it is believed that due to the small degree of cooling in the present tests (the minimum value of T_w/T_{aw} being approximately 0.86), the overall error in the heating rate resulting from a small error in the characteristic length of the boundary-layer growth will be negligible. Data from the reference tests are generally in good agreement with those of the current tests at Mach numbers of 3.51 and 4.44, although both sets of data fall considerably below the theoretical values throughout the Mach number range.

A possible source of error in the experimental measurements could have been the heat loss to the plate-supporting material; however, a 23-percent heat loss was considered to be the maximum from preliminary estimates, an amount which does not account for the discrepancy between theory and experiment. An attempt was made to minimize the effect of this internal heat loss by either presenting the results of the protuberance effects on the flat-plate heating rates in ratio form or discussing relative magnitudes.

Effect of Stringers on Flat-Plate Heating Distribution

Since a large part of the test program was conducted with the longitudinal stringers attached to the flat plate simulating the S-IVB surface, it was necessary to determine the stiffener effect on the plate heating distribution before assessing the protuberance effects. Presented in figure 8 for the three test Mach numbers are the heating distributions obtained on the plate both with (configuration 7) and without (configuration 1) stringers. The effect of the stringers is an overall decrease in the plate heating distribution at all Mach numbers. This trend is generally the same as that obtained in the valley of a corrugated panel in previous tests, the results of which are reported in reference 1. It is believed that this decrease in heating is due to a decrease in the local shearing stress associated with the momentum defect imposed by the stringers. At $x \approx 12$ in. (0.305 m), 12.6-, 27.1-, and 40.6-percent decreases (approx.) in heating occur at Mach numbers of 2.49, 3.51, and 4.44, respectively; at $x \approx 20$ in. (0.508 m), 14.0-, 35.8-, and 44.0-percent decreases (approx.) in heating occur at the respective test Mach numbers. In general, the percent decrease in heating increases with either an increasing distance x or an increasing Mach number.

Effect of Protuberances on Flat-Plate Heating Distribution

The effect of protuberance-model geometry on the flat-plate heating distribution at the test Mach numbers is shown in figure 9. The values presented in this figure are the ratios of the heat-transfer coefficients obtained on the stringer plate with the models attached to the heat-transfer coefficients obtained on the stringer plate alone. Also shown in figure 9 are two-dimensional shock waves and expansion fans that would occur at free-stream conditions on a two-dimensional body having cross sections the same as the wedge-rectangular sections of the general protuberance models. The shock waves and expansion fans are presented to provide a comparison between the actual interference region created by the model and a nonviscous region affected by a two-dimensional model.

The heating distributions obtained on the plate with models 3, 4 reversed, and 5 are presented in figure 9(a) for $M = 2.49$. For model 5 which has 15° forebody and afterbody included angles, the interference region, indicated by the increase in measured heating

rates, is confined to a region downstream of the model apex. The increase in heating initially occurs slightly upstream of the two-dimensional shock wave calculated for the model nose because of the lower Mach numbers within the boundary layer and the propagation of the pressures within the subsonic portion of the boundary layer. In general, the heating distribution consists of an increase in heating downstream of the nose-shock location, extending to the expansion fan originating at the forebody-afterbody juncture where a decrease in heating occurs. A second increase in the heating is obtained downstream of the model afterbody; the magnitude of this heating is greater than that in the vicinity of the model nose. The maximum increase in heating in the model wake occurring immediately downstream of the model afterbody is approximately 77 percent greater than the heating on the plate alone; the maximum heating in the region of the model nose is 40 percent greater.

The effect of model 3 on the stringer-plate heating distribution is similar to the effect of model 5. The interference effects are confined to a region downstream of the model nose, this confinement indicating little flow separation upstream of the model. Increases in heating are again obtained on the plate surface in the model wake, the maximum heating being approximately 139 percent greater than that on the stringer plate alone; the maximum heating in the region of the model nose is 73 percent greater.

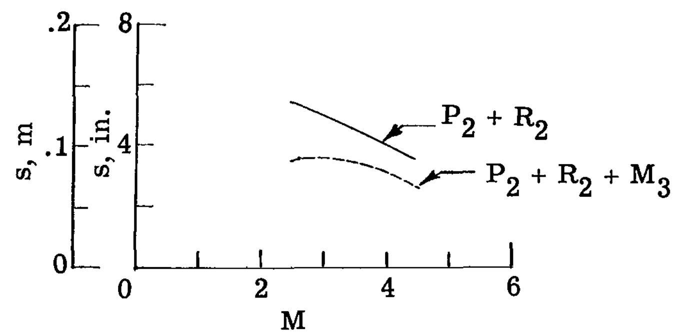
The large heating rates obtained on the stringer plate with model 4 reversed clearly indicate the presence of forced separation occurring in the upstream vicinity of the model nose. The interference region created by the model extends upstream approximately 15 in. (0.381 m) with the maximum measured heating rate being 4.26 times the undisturbed plate value and occurring approximately 1 in. (0.025 m) upstream of the model. The heating rates obtained in the model wake are small compared with the large heating rates obtained in the separated nose region; however, they are greater than those for the plate alone, the maximum value being approximately 1.54 times the flat-plate value.

The trends in the plate heating distributions for models 5, 3, and 4 reversed at $M = 3.51$ and 4.44 shown in figures 9(b) and 9(c), respectively, are generally the same as those at $M = 2.49$.

In the regions of flow interference other than the wake (excluding model 4 reversed), the trends of the measured heating rates are believed to be due primarily to variations in the local flow properties produced by shock waves and expansion fans, as indicated in figure 9. The increase in heating in the model wake, however, is believed to be associated with the model promoting forced mixing within the plate boundary layer. This turbulence causes the slower air near the plate to mix with the faster fluid farther out. Therefore, the velocity gradient at the plate surface would increase, with a resulting increase in the shearing stress and heat transfer. This reasoning is substantiated to

some extent by the forced mixing obtained by relatively simple geometry protuberances as discussed in reference 12. If this forced mixing does occur in the model wake, then any flow effects produced by adverse pressure gradients downstream of the model would be expected to be delayed because the higher momentum air in the vicinity of the plate surface is able to negotiate a larger turning angle.

The upstream influence of the 17^{o} ramp (indicated by s, the surface distance upstream of the ramp leading edge) is shown in sketch 3. The distances were determined by comparing the heating rates obtained on configurations 17 $(P_2 + R_2)$ and 21 $(P_2 + R_2 + M_3)$ with those obtained on configurations 7 (P_2) and 17 $(P_2 + R_2)$. The delay in the ramp effect on the plate heating rates in the wake of model 3, as indicated in sketch 3, occurs for all the test Mach numbers.



Sketch 3

The effect of model geometry on the stringer-plate heating rates measured in the model wake is presented in figure 10 for the three test Mach numbers. Also shown in the figure for comparison purposes are average plate heating rates for $0 < x \leqq 27$ in. (0.686 m) $(y = 0)$ obtained on the stringer plate alone for the respective Mach numbers. The heat-transfer coefficients h of models 1, 2 reversed, 3, 4 reversed, and 5 are plotted as a function of the plate surface length downstream of the centerbody-afterbody junctures of the models (x'). This origin for the x' coordinate was selected since the flow experiences a small, localized separation at this point for all models and is believed to be the point at which the forced mixing is initiated. At a free-stream Mach number of 2.49 (fig. 10(a)), maximum heating rates were obtained in the wake of model 3; however, the minimum rates which were obtained for model 1 were only approximately 30 percent less than those obtained for model 3 within the same range of x', $18 < x' < 28$ inches $(0.457 < x' < 0.711$ meter). For the remaining models no clear trend is indicated in the variation of the wake heating rates with model geometry for those geometric variables presented.

Heating rates obtained on the stringer plate in the wakes of these same models are presented in figure 10(b) for a free-stream Mach number of 3.51. A general decrease in the magnitudes of the heating rates occurs as the free-stream Mach number increases from 2.49 to 4.44. As was determined at $M = 2.49$, at $M = 3.51$ no explicit trend is evident in the heating-rate variation with model geometry. Further, the relative magnitudes of the results obtained for the various models at $M = 3.51$ are not consistent with those obtained at $M = 2.49$. For $M = 3.51$, the range of the magnitudes of the wake heating rates for $18 < x' < 28$ inches $(0.457 < x' < 0.711$ meter) deviated approximately ± 25 percent from an average distribution that is roughly 60 percent greater than the average stringer-plate value within this same range of x'. This increase can be compared with the approximate 50-percent average wake increase at $M = 2.49$. The results obtained at $M = 4.44$ (fig. 10(c)) show a further decrease in the magnitudes of the wake heating rates with an increase in Mach number; however, the average of these values for $18 < x' < 28$ inches $(0.457 < x' < 0.711$ meter) is approximately 70 percent greater than the average stringer-plate value within the same range of x'.

Heating distributions obtained in the wakes of the one-half, one, and double scale versions of model 3 are presented in figure 11 for the three test Mach numbers. However, the effect shown in figure 11 is not a true scale effect but a model size effect, since the boundary-layer thickness remained approximately constant and the stringer size and spacing were constant. Also shown in the figure for comparison purposes are the average stringer-plate heating rates obtained downstream of the model attach point for each Mach number. In general, considering the previously mentioned limitation of the true scale effect, a fair correlation of the experimental heat-transfer coefficients was obtained for the test Mach numbers from the ratio of x' to the model scale. Results at free-stream Mach numbers of 2.49 and 3.51 were obtained and included in table IV for the scale models mounted on the clean plate. With the exception of model 7 at $M = 2.49$, the magnitudes of the wake heating rates relative to the clean plate heating rates are approximately the same as those shown in figure 11 for the same locations. For the clean plate tests, the values in the wake of model 7 at $M = 2.49$ are even greater than those obtained on model 3. There is no apparent explanation for this indicative stringer effect. The results obtained with the clean plate also indicate a slight increase in heating with an increase in model scale at $M = 2.49$ and 3.51.

Heating Distributions on Stringer Plate and Ramp

The heating distributions obtained along the center line of the stringer plate and ramp configuration are presented in ratio form in figure 12 for the test Mach numbers. The ratios presented for $x < 25.5$ inches (0.648 meter) are the heat-transfer coefficients obtained for configuration 17 divided by those obtained for configuration 7 at comparable locations. The ratios presented for the ramp ($x > 25.5$ inches ($x > 0.648$ meter)) are the

heat-transfer coefficients obtained on the ramp divided by the average heat-transfer coefficient obtained on the center line of the stringer plate alone ($0 < x < 23$ inches ($0 < x < 0.584$ meter)) at the corresponding Mach numbers. Also shown in figure 12 are theoretical ramp heating rates divided by the theoretical flat-plate values (calculated from ref. 10) immediately upstream of the ramp. The theoretical flat-plate distributions for the ramp are based on local conditions from oblique shock theory and a characteristic length determined for a boundary-layer thickness of 6 inches (0.152 meter). The effect of the ramp on the stringer-plate heating distribution is confined to the region from approximately 5 inches (0.127 meter) upstream of the ramp leading edge at $M = 2.49$ to approximately 3 inches (0.0762 meter) upstream at $M = 4.44$. The latter distance is more clearly defined by comparing the magnitudes of the heating rates for the two configurations rather than a ratio of the two as presented in figure 12. In general, the theoretical estimates on the ramp are considerably lower than the measured data, the difference increasing for increasing Mach number. It should be noted, however, that although the experimental increase in heating on the ramp is greater than the increase predicted by theory, the magnitude of these heating rates is actually less than theory.

Effect of Ramp on Heating Distribution of Stringer Plate With Protuberances

Shown in figure 13 are the effects of the 17° ramp on the stringer-plate heating distributions obtained with models 1, 2 reversed, and 3, which were the only models tested both with and without the ramp. Results are given for $y = 0$, $y = 4$ inches (0.102 meter), and $y = 10$ inches (0.254 meter) at the three test Mach numbers. The ramp effect is presented in terms of the ratio of the heating rates on the plate with the ramp in position to those on the plate without the ramp as a function of the surface length x. These results show that for the three models the effect of the ramp at these values of y is confined within the region shown in figure 12 and extends, at most, approximately 6 inches (0.152 meter) upstream of the ramp. It appears, as discussed subsequently, that a more extensive ramp effect is obtained with other models.

The heating rates obtained on the stringer plate in the wakes of all the general models tested with the ramp are shown in figure 14 for the three test Mach numbers. Also shown in the figure for comparison purposes are the heating rates obtained on the stringer plate alone (configuration 7) and those obtained on the stringer plate in the wakes of the models without the ramp. The wake heating rates obtained for models 1, 2 reversed, and 3 fall within the data scatter obtained for these same models without the ramp, with the exception of the heating rates in the region occurring at the ramp leading edge. The measured wake heating rates for models 4 and 2 fall considerably below the range of values obtained for the other models and, in fact, for some conditions are lower

than those values obtained on the stringer plate alone. For these two models, the distances from the model centerbody-afterbody juncture to the ramp leading edge x_s are smaller than for the other models. It is believed that the reduced heating rates for these two models, relative to those obtained for model 3 within the same range of x', are associated with the flow not reattaching in this region because of the adverse pressure gradient produced by the ramp being in proximity to the model afterbody region.

Effect of Model Wakes on Ramp Heating Distribution

Shown in figure 15 are the effects of the wakes of models 1, 2, 3, 4, and 2 reversed (same models as in figs. 14) on the heating rates obtained on the ramp center line. The abscissa is simply the surface length from the ramp leading edge, rather than the surface length from the model centerbody-afterbody juncture as used in figure 14. This surface length was selected for figure 15 in order to make a direct comparison between the magnitudes of the heating rates obtained in the wakes of the various models with those obtained for the stringer plate alone (configuration 17). As shown in this figure, the wake effect of model 3 on the ramp center line consists of an increase in heating similar to those increases obtained in the model wakes on the stringer plate. In general, the heating rates obtained in the wakes of the remaining models, downstream of the ramp leading edge, are either approximately equal (within data accuracy) or less than the ramp values obtained with the stringer plate alone. For $x_s \leqq 16$ in., the heating rates on the ramp are lower than those on the ramp with the stringer plate alone. The maximum heating rates obtained on the ramp aft of model 3 were roughly 1.7, 1.6, and 1.4 times the ramp values for the stringer plate and ramp alone for Mach numbers 2.49, 3.51, and 4.44, respectively.

The heating rates presented in figure 15 are replotted in figure 16 on the basis of the surface distance correlation parameter x', which has been used previously in figures 10 and 14. Using this surface length results in a better correlation of the ramp center-line values for all models except model 3. The values for this model are again consistently higher at each test Mach number. At the present time, there is no known explanation for this difference in the level of heating between model 3 and the other models.

Model Heating Rates

Heating rates obtained on the surfaces of models 1, 2 reversed, and 4 reversed are presented in figure 17 for a Mach number of 2.49. In general, the variation of the magnitude of heating for the various components of each of the three models is as would be expected – that is, large heating rates on the nose, a decrease in heating on the centerbody, and a further decrease on the afterbody. Also, a trend is noted in the heating rates

for each of the three models: an increase in heating with an increase in distance from the model base or plate surface.

The effect of forebody geometry on the heating rates along the model center line is shown in figure 18 for models 1, 2 reversed, and 4 reversed for the test Mach numbers. These three models have identical centerbody dimensions and afterbody angles but have forebody angles of 15°, 30°, and 90°. For the test Mach numbers, the forebody heating rates increase with increasing forebody angle to a maximum value adjacent to the forebody-centerbody juncture. The heating rates on the models decrease with increasing Mach number, as expected, and the relative magnitudes for the three Mach numbers are generally consistent over the model surface.

The surface heating rates obtained on models 1, 2 reversed, and 3, tested with and without the ramp, at the test Mach numbers are shown in figure 19. There appears to be no significant effect due to the presence of the ramp, since all variations in the magnitude of the heating rates on the afterbodies are well within the accuracy of the data.

CONCLUSIONS

From heat-transfer measurements obtained on a flat-plate surface in the proximity of several protuberance configurations at free-stream Mach numbers of 2.49, 3.51, and 4.44, the following conclusions are derived:

(1) The magnitude of heat-transfer measurements obtained on the flat-plate surface with longitudinal stringers was less than that obtained on the clean plate.

(2) The heating distributions obtained on the stringer-plate assembly within the nose interference regions created by a series of protuberance configurations were consistent with trends from the results of previous investigations. These trends consisted of high heating rates covering large areas upstream of bluff protuberances and relatively lower heating rates covering small areas in the nose region of the more streamlined configurations.

(3) Heating rates obtained on the stringer plate in the protuberance wakes were greater than those obtained for the clean stringer plate. The maximum increase resulting from the protuberance wakes was approximately 139 percent greater than the clean stringer-plate value.

(4) No trend in the effect of model geometry on the protuberance wake heating rates was observed for the test range of variables. Fair correlation of the wake heating rates was obtained for all general models including three scale models with ratios 1/2, 1, and 2, when the local heat-transfer coefficients were plotted as a function of the plate surface length from the model centerbody-afterbody juncture.

(5) There was no significant effect on the plate heating rates in the model wakes as a result of placing a 17° ramp downstream of the model afterbody, except when the ramp was located less than or equal to 16 inches (0.406 meter) from the model centerbody-afterbody juncture. For these leading-edge locations the adverse pressure gradient created by the ramp apparently produces flow separation in the model wake resulting in a reduction in the local heating rates.

(6) The effect of the protuberance wake on the flat-plate surface was an increase in heating and only occurred for one model on the ramp surface. The magnitudes of the heating rates obtained on the ramp in the wakes of the remaining models were approximately equal to those obtained on the ramp without any models installed on the plate surface.

(7) The decrease in heating for increasing distance along the protuberance models was in agreement with results obtained from previous investigations. There were no noticeable effects on the model heating rates as a result of placing a 17° ramp downstream of the model installation.

Langley Research Center,
National Aeronautics and Space Administration,
Langley Station, Hampton, Va., June 24, 1966,
126-10-02-06-23.

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INDEX TO TABULAR DATA

TABLE I.- CONFIGURATION IDENTIFICATION

Configuration	Components	Configuration	Components
1	P_1	13	$P_2 + M_6$
2	$P_1 + R_1$	14	$P_2 + M_7$
3	$P_1 + M_3$	15	$P_2 + M_9$
4	$P_1 + R_1 + M_3$	16	$P_2 + M_{10}$
5	$P_1 + M_6$	17	$P_2 + R_2$
6	$P_1 + M_7$	18	$P_2 + R_2 + M_1$
7	P_2	19	$P_2 + R_2 + M_2$
8	$P_2 + M_1$	20	$P_2 + R_2 + M_2$ reversed
9	$P_2 + M_2$ reversed	21	$P_2 + R_2 + M_3$
10	$P_2 + M_3$	22	$P_2 + R_2 + M_4$
11	$P_2 + M_4$ reversed	23	$P_2 + R_2 + M_8$
12	$P_2 + M_5$		

TABLE II.- INSTRUMENTATION LOCATIONS

(a) Test plate

Thermocouple	x		y		z	
	in.	m	in.	m	in.	m
1	-29.0	-0.737	0	0	0	0
2	-28.0	-.711				
3	-27.0	-.686				
4	-26.0	-.660				
5	-25.0	-.635				
6	-24.0	-.610				
7	-23.0	-.584				
8	-22.0	-.559				
9	-21.0	-.533				
10	-20.0	-.508				
11	-19.0	-.483				
12	-18.0	-.457				
13	-17.0	-.432				
14	-16.0	-.406				
15	-15.0	-.381				
16	-14.0	-.356				
17	-13.0	-.330				
18	-12.0	-.305				
19	-11.0	-.279				
20	-10.0	-.254				
21	-9.0	-.229				
22	-8.0	-.203				
23	-7.0	-.178				
24	-6.0	-.152				
25	-5.0	-.127				
26	-4.0	-.102				
27	-3.6	-.091				
28	-3.3	-.084				
29	3.5	.089				
30	4.0	.102				
31	5.0	.127				
32	6.0	.152				
33	7.0	.178				
34	8.0	.203				
35	9.0	.229				
36	10.0	.254				
37	11.0	.279				
38	12.0	.305				
39	13.0	.330				
40	14.0	.356				
41	15.0	.381				
42	16.0	.406				
43	17.0	.432				
44	18.0	.457				
45	19.0	.483				
46	20.0	.508				
47	21.0	.533				
48	22.0	.559				
49	23.0	.584				
50	24.0	.610				
51	25.0	.635				
52	26.0	.660				
53	27.0	.686				
54	-28.3	-.719	2.0	0.051		
55	-24.5	-.622	2.0	.051		
56	-24.5	-.622	4.0	.102		
57	-24.5	-.622	6.0	.152		
58	-24.5	-.622	8.0	.203		
59	-24.5	-.622	10.0	.254		
60	-24.5	-.622	14.0	.356		
61	-19.5	-.495	2.0	.051		
62	-19.5	-.495	4.0	.102		
63	-19.5	-.495	6.0	.152		
64	-19.0	-.483	10.0	.254		
65	-17.0	-.432	4.0	.102		
66	-17.0	-.432	10.0	.254		
67	-15.0	-0.381	2.0	0.051	0	0
68	-15.0	-.381	4.0	.102		
69	-15.0	-.381	6.0	.152		
70	-15.0	-.381	8.0	.203		
71	-15.0	-.381	10.0	.254		
72	-15.0	-.381	12.0	.305		
73	-15.0	-.381	16.0	.406		
74	-13.0	-.330	4.0	.102		
75	-13.0	-.330	10.0	.254		
76	-11.0	-.279	2.0	.051		
77	-11.0	-.279	4.0	.102		
78	-11.0	-.279	10.0	.254		
79	-9.0	-.229	4.0	.102		
80	-9.0	-.229	10.0	.254		
81	-7.0	-.178	4.0	.102		
82	-7.0	-.178	10.0	.254		
83	-5.0	-.127	2.0	.051		
84	-5.0	-.127	4.0	.102		
85	-5.0	-.127	6.0	.152		
86	-5.0	-.127	8.0	.203		
87	-5.0	-.127	10.0	.254		
88	-5.0	-.127	12.0	.305		
89	-5.0	-.127	14.0	.356		
90	-5.0	-.127	16.0	.406		
91	0	0	4.0	.102		
92	0	0	10.0	.254		
93	5.0	.127	2.0	.051		
94	5.0	.127	4.0	.102		
95	5.0	.127	6.0	.152		
96	5.0	.127	8.0	.203		
97	5.0	.127	10.0	.254		
98	5.0	.127	12.0	.305		
99	5.0	.127	14.0	.356		
100	5.0	.127	16.0	.406		
101	10.0	.254	2.0	.051		
102	10.0	.254	10.0	.254		
103	15.0	.381	2.0	.051		
104	15.0	.381	4.0	.102		
105	15.0	.381	6.0	.152		
106	15.0	.381	10.0	.254		
107	15.0	.381	14.0	.356		
108	20.0	.508	2.0	.051		
109	20.0	.508	10.0	.254		
110	25.0	.635	2.0	.051		
111	25.0	.635	4.0	.102		
112	25.0	.635	6.0	.152		
113	25.0	.635	8.0	.203		
114	25.0	.635	10.0	.254		
115	25.0	.635	12.0	.305		
116	25.0	.635	14.0	.356		
117	-24.5	-.622	-6.0	-.152		
118	-18.8	-.478	-10.0	-.254		
119	-15.0	-.381	-6.0	-.152		
120	-7.0	-.178	-10.0	-.254		
121	-5.0	-.127	-10.0	-.254		
122	10.0	.254	-10.0	-.254		
123	20.0	.508	-10.0	-.254		
[a]130	-15.1	-.384	6.8	.173	0.3	0.008
[a]131	-5.8	-.147	3.0	.076	.5	.013
[a]132	-5.1	-.130	7.0	.178	.5	.013
[a]133	4.3	.109	3.2	.081	.3	.008
[a]134	4.9	.124	7.2	.183	.3	.008
[a]135	14.3	.363	2.8	.071	.3	.008
[a]136	-19.4	-.493	-1.0	-.025	.5	.013
[a]137	-16.2	-.411	-1.2	-.030	.3	.008
[a]138	-13.1	-.333	-.8	-.020	.3	.008

[a]Thermocouples 130 to 138 located on stringers.

TABLE II.- INSTRUMENTATION LOCATIONS - Continued

(b) Ramp

Thermo-couple	x_r, in.	x_r, m	y, in.	y, m	z, in.	z, m
150	4.3	0.109	0	0	0	0
151	4.9	.124				
152	7.2	.183				
153	9.5	.241				
154	11.8	.300				
155	14.0	.356				
156	16.3	.414				
157	17.6	.447				
158	4.9	.124	2.0	0.051		
159	4.9	.124	6.0	.152		
160	4.9	.124	10.0	.254		
161	4.9	.124	12.0	.305		
162	9.5	.241	2.0	.051		
163	9.5	.241	4.0	.102		
164	9.5	.241	6.0	.152		
165	9.5	.241	8.0	.203		
166	9.5	.241	10.0	.254		
167	9.5	.241	12.0	.305		
168	11.4	.290	8.0	.203		
169	13.9	.353	8.0	.203		
170	16.3	.414	2.0	.051		
171	16.3	.414	4.0	.102		
172	16.3	.414	6.0	.152		
173	16.3	.414	8.0	.203		
174	16.3	.414	10.0	.254		
175	16.3	.414	12.0	.305		
176	4.9	.124	-6.0	-.152		
177	9.5	.241	-6.0	-.152		
[a]180	5.0	.127	7.0	.178	0.5	0.013
[a]181	7.0	.178	6.8	.173	.3	.008
[a]182	9.5	.241	7.2	.183	.3	.008
[a]183	11.7	.297	7.0	.178	.5	.013
[a]184	5.0	.127	-1.0	-.025	.5	.013
[a]185	7.0	.178	-1.2	-.030	.3	.008
[a]186	9.5	.241	-.8	-.020	.3	.008
[a]187	11.7	.297	-1.0	-.025	.5	.013

[a]Thermocouples 180 to 187 located on stringers.

TABLE II.- INSTRUMENTATION LOCATIONS – Continued

(c) Model 1

Thermocouple	x_m, in.	x_m, m	y, in.	y, m	z, in.	z, m
200	-18.5	-0.470	0	0	2.0	0.051
201	-16.0	-.406	-1.3	-.033	1.5	.038
202	-13.6	-.345	0	0	3.3	.084
203	-8.3	-.211	0	0	4.7	.119
204	-8.3	-.211	-2.3	-.058	2.9	.074
205	-8.3	-.211	-2.4	-.061	1.5	.038
206	-5.8	-.147	0	0	5.0	.127
207	-5.8	-.147	-2.4	-.061	3.1	.079
208	-5.8	-.147	-2.5	-.064	1.5	.038
209	-1.1	-.028	0	0	5.0	.127
210	-1.1	-.028	-2.4	-.061	3.1	.079
211	-1.1	-.028	-2.5	-.064	1.5	.038
212	3.7	.094	0	0	5.0	.127
213	3.7	.094	-2.4	-.061	3.1	.079
214	3.7	.094	-2.5	-.064	1.5	.038
215	6.2	.157	0	0	4.7	.119
216	6.2	.157	-2.3	-.058	2.9	.074
217	6.2	.157	-2.4	-.061	1.5	.038
218	11.5	.292	0	0	3.3	.084
219	13.9	.353	1.3	.033	1.5	.038
220	16.3	.414	0	0	2.0	.051

(d) Model 2

Thermocouple	x_m, in.	x_m, m	y, in.	y, m	z, in.	z, m
300	-12.4	-0.315	0	0	2.0	0.051
301	-10.0	-.254	-1.3	-.033	1.7	.043
302	-7.7	-.196	0	0	3.2	.081
303	-3.0	-.076	0	0	4.6	.117
304	-3.0	-.076	-2.2	-.056	2.9	.074
305	-3.0	-.076	-2.3	-.058	1.5	.038
306	.3	.008	0	0	5.0	.127
307	.3	.008	-2.5	-.064	3.1	.079
308	.3	.008	-2.5	-.064	1.5	.038
309	5.0	.127	0	0	5.0	.127
310	5.0	.127	-2.5	-.064	3.1	.079
311	5.0	.127	-2.5	-.064	1.5	.038
312	9.8	.249	0	0	5.0	.127
313	9.8	.249	-2.5	-.064	1.5	.038
314	12.8	.325	0	0	4.1	.104
315	12.8	.325	-2.0	-.051	1.5	.038
316	14.6	.371	-1.5	-.038	1.9	.048
317	16.4	.417	0	0	1.9	.048

TABLE II.- INSTRUMENTATION LOCATIONS – Continued

(e) Model 3

Thermocouple	x_m, in.	x_m, m	y, in.	y, m	z, in.	z, m
400	-8.6	-0.218	0	0	1.5	0.038
401	-6.5	-.165	-1.3	-.033	1.5	.038
402	-6.0	-.152	0	0	2.9	.074
403	-3.5	-.089	0	0	4.4	.112
404	-3.5	-.089	-2.1	-.053	2.8	.071
405	-3.5	-.089	-2.2	-.056	1.5	.038
406	-1.5	-.038	0	0	5.0	.127
407	-1.5	-.038	-2.4	-.061	3.2	.081
408	-1.5	-.038	-2.5	-.064	1.5	.038
409	1.5	.038	0	0	5.0	.127
410	1.5	.038	-2.4	-.061	3.2	.081
411	1.5	.038	-2.5	-.064	1.5	.038
412	3.5	.089	0	0	4.4	.112
413	3.5	.089	-2.2	-.056	1.5	.038
414	4.5	.114	-1.9	-.048	2.4	.061
415	6.6	.168	0	0	2.6	.066

(f) Model 4

Thermocouple	x_m, in.	x_m, m	y, in.	y, m	z, in.	z, m
500	-13.6	-0.345	0	0	2.0	0.051
501	-11.2	-.284	-1.3	-.033	1.5	.038
502	-8.8	-.224	0	0	3.2	.081
503	-3.5	-.089	0	0	4.7	.119
504	-3.5	-.089	-2.3	-.058	2.9	.074
505	-3.5	-.089	-2.4	-.061	1.5	.038
506	-1.0	-.025	0	0	5.0	.127
507	-1.0	-.025	-2.4	-.061	3.1	.079
508	-1.0	-.025	-2.5	-.064	1.5	.038
509	3.8	.097	0	0	5.0	.127
510	3.8	.097	-2.4	-.061	3.1	.079
511	3.8	.097	-2.5	-.064	1.5	.038
512	6.5	.165	0	0	5.0	.127
513	6.5	.165	-2.4	-.061	3.1	.079
514	6.5	.165	-2.5	-.064	1.5	.038
515	10.0	.254	0	0	4.0	.102
516	10.0	.254	-1.2	-.030	1.5	.038
517	10.0	.254	0	0	1.5	.038

TABLE II.- INSTRUMENTATION LOCATIONS – Continued

(g) Model 5

Thermocouple	x_m		y		z	
	in.	m	in.	m	in.	m
600	-11.5	-0.292	0	0	1.9	0.048
601	-9.0	-.229	-1.3	-.033	1.5	.038
602	-6.5	-.165	0	0	3.2	.081
603	-1.5	-.038	0	0	4.6	.117
604	-1.5	-.038	-2.2	-.056	3.0	.076
605	-1.5	-.038	-2.3	-.058	1.5	.038
606	1.5	.038	0	0	4.6	.117
607	1.5	.038	-2.2	-.056	3.0	.076
608	1.5	.038	-2.3	-.058	1.5	.038
609	6.5	.165	0	0	3.2	.081
610	9.0	.229	-1.3	-.033	1.5	.038
611	11.5	.292	0	0	1.9	.048

(h) Model 6

Thermocouple	x_m		y		z	
	in.	m	in.	m	in.	m
700	-3.8	-0.097	0	0	1.0	0.025
701	-2.8	-.071	-.8	-.020	.8	.020
702	-1.8	-.046	0	0	2.2	.056
703	-1.8	-.046	-1.1	-.028	1.4	.036
704	-1.8	-.046	-1.0	-.028	.8	.020
705	-.8	-.020	0	0	2.5	.064
706	-.8	-.020	-1.2	-.030	1.5	.038
707	-.8	-.020	-1.2	-.030	.8	.020
708	.7	.018	0	0	2.5	.064
709	.7	.018	-1.2	-.030	1.5	.038
710	.7	.018	-1.2	-.030	.8	.020
711	1.7	.043	0	0	2.2	.056
712	1.7	.043	-1.1	-.028	1.4	.036
713	1.7	.043	-1.1	-.028	.8	.020
714	2.7	.069	-.8	-.020	.8	.020
715	3.7	.094	0	0	1.0	.025

TABLE II.- INSTRUMENTATION LOCATIONS – Continued

(i) Model 7

Thermocouple	x_m, in.	x_m, m	y, in.	y, m	z, in.	z, m
800	-14.5	-0.368	0	0	4.5	0.114
801	-10.6	-.269	-3.3	-.084	4.2	.107
802	-6.6	-.168	0	0	9.1	.231
803	-6.6	-.168	-4.4	-.112	5.6	.142
804	-6.6	-.168	-4.5	-.114	1.5	.038
805	-3.5	-.089	0	0	10.0	.254
806	-3.5	-.089	-4.7	-.119	6.7	.170
807	-3.5	-.089	-5.0	-.127	1.5	.038
808	3.5	.089	0	0	10.0	.254
809	3.5	.089	-4.7	-.119	6.7	.170
810	3.5	.089	-5.0	-.127	1.5	.038
811	6.5	.165	0	0	9.1	.231
812	6.5	.165	-4.4	-.112	5.6	.142
813	6.5	.165	-4.5	-.114	1.5	.038
814	10.6	.269	-3.3	-.084	4.2	.107
815	14.5	.368	0	0	4.5	.114

(j) Model 8

Thermocouple	x_m, in.	x_m, m	y, in.	y, m	z, in.	z, m
900	-7.9	-0.201	0	0	2.0	0.051
901	-6.7	-.170	-4.1	-.104	1.6	.041
902	-6.7	-.170	-3.5	-.089	.6	.015
903	-3.6	-.091	0	0	4.5	.114
904	-.1	-.003	0	0	6.5	.165
905	.1	.003	-7.2	-.183	5.6	.142
906	.7	.018	-8.3	-.211	3.5	.089
907	.7	.018	-5.7	-.145	.6	.015
908	3.1	.079	0	0	7.4	.188
909	6.2	.157	0	0	7.4	.188
910	6.2	.157	-7.9	-.201	6.4	.163
911	6.2	.157	-8.9	-.226	4.0	.102
912	6.2	.157	-6.3	-.160	.6	.015
913	8.0	.203	0	0	7.4	.188
914	14.5	.368	-3.5	-.089	7.4	.188
915	16.2	.411	0	0	9.0	.229
916	16.2	.411	-8.9	-.226	4.0	.102
917	16.2	.411	-6.3	-.160	.6	.015

TABLE II.- INSTRUMENTATION LOCATIONS – Concluded

(k) Model 9

Thermo-couple	x_m		y		z	
	in.	m	in.	m	in.	m
950	-2.3	-0.058	0	0	0.1	0.003
951	-1.7	-.043	0	0	.3	.008
952	-1.1	-.028	0	0	.4	.010
953	-.6	-.015	0	0	.6	.015
954	-.1	-.003	0	0	.6	.015
955	.6	.015	0	0	.4	.010
956	1.1	.028	0	0	.3	.008
957	1.7	.043	0	0	.1	.003
958	-1.1	-.028	2.0	.051	.4	.010
959	-.6	-.015	2.0	.051	.6	.015
960	-2.3	-.058	-.5	-.013	.1	.003
961	-1.7	-.043	-.5	-.013	.3	.008
962	-1.1	-.028	-.5	-.013	.4	.010
963	-.6	-.015	-.5	-.013	.6	.015
964	-.6	-.015	-1.0	-.025	.6	.015
965	-.1	-.003	-.5	-.013	.6	.015
966	-.1	-.003	-1.0	-.025	.6	.015
967	1.7	-.043	-.5	-.013	.1	.003

TABLE III.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND FOR PLATE WITH RAMP WITHOUT STRINGERS

(a) Configuration 1; P_1

Thermocouple	M = 2.49; T_t = 403° K; p_t = 155 994 N/m²			M = 3.51; T_t = 394° K; p_t = 257 356 N/m²			M = 4.44; T_t = 378° K; p_t = 414 356 N/m²		
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{T_e}{T_t}$	T_w, °K	h (a)
1	.96822	326.2	50.0	.95337	316.4	25.1	.93997	315.9	12.1
2	.96773	326.3	51.7	.95271	316.2	26.6	.93991	315.8	12.5
3	.96850	326.4	50.5	.95330	316.4	25.7	.94092	316.1	11.8
4	.96787	326.0	48.8	.95286	316.1	25.1	.94077	316.0	12.1
5	.96745	326.0	50.5	.95205	316.0	26.4	.94025	315.9	12.9
6	.96703	326.1	51.9	.95175	315.9	26.1	.93991	315.7	12.7
7	.96639	325.7	50.5	.95131	315.7	25.9	.93961	315.7	12.3
8	.96624	325.6	51.1	.95100	315.6	25.9	.93932	315.5	12.7
9	.96589	325.6	51.3	.95065	315.5	26.6	.93909	315.5	12.5
10	.96569	325.4	51.1	.95050	315.4	26.4	.93903	315.3	11.8
11	.96562	325.4	50.9	.95034	315.3	25.9	.93909	315.3	11.4
12	.96498	325.2	51.9	.94984	315.2	26.1	.93844	315.1	12.1
13	.96534	325.7	53.1	.95028	315.5	27.4	.93896	315.4	12.7
15	.96463	325.4	52.7	.94975	315.3	27.2	.93844	315.2	12.7
16	.96512	325.4	52.3	.95013	315.3	26.6	.93903	315.4	12.1
17	.96483	325.4	52.5	.94984	315.3	27.4	.93888	315.4	12.5
18	.96448	325.2	52.1	.94969	315.2	26.6	.93881	315.3	12.7
19	.96421	325.1	52.7	.94931	315.2	27.0	.93851	315.2	12.1
20	.96400	325.1	52.3	.94947	315.2	26.8	.93851	315.2	11.4
21	.96406	325.1	51.9	.94916	315.1	27.0	.93851	315.1	11.2
22	.96400	325.1	52.3	.94931	315.1	26.8	.93866	315.2	11.6
23	.96393	325.0	51.7	.94903	315.1	27.2	.93851	315.2	12.1
24	.96365	324.8	51.5	.94894	315.0	26.6	.93844	315.2	12.1
25	.96393	324.9	52.1	.94916	315.1	26.6	.93874	315.2	11.8
26	.96463	325.2	52.1	.95028	315.5	26.4	.93982	315.6	11.4
27	.96421	324.9	50.0	.95050	315.3	25.7	.93997	315.5	10.8
28	.96421	325.0	50.5	.95072	315.5	26.4	.94004	315.6	10.8
29	.96463	325.4	53.9	.95256	316.1	27.2	.94077	316.0	13.7
30	.96435	325.2	53.1	.95146	315.8	26.8	.93997	315.7	12.5
31	.96413	325.2	53.7	.95065	315.5	27.0	.93932	315.5	12.7
32	.96413	325.1	52.9	.95041	315.5	26.1	.93961	315.5	12.7
33	.96351	324.9	52.5	.94975	315.3	26.6	.93932	315.5	11.4
34	.96470	325.2	52.3	.95080	315.6	26.6	.94040	315.9	13.1
35	.96492	325.2	52.9	.95094	315.6	27.0	.94083	316.0	12.9
36	.96435	325.0	51.9	.95080	315.5	26.1	.94069	315.9	12.7
37	.96448	325.1	52.3	.95124	315.7	26.8	.94120	316.1	12.7
38	.96413	325.1	52.3	.95124	315.6	26.4	.94098	316.0	13.1
39	.96421	325.1	53.1	.95168	315.8	26.6	.94142	316.1	13.5
40	.96266	324.6	52.9	.95050	315.5	26.8	.94049	315.7	12.5
41	.96287	324.8	53.7	.95131	315.9	26.8	.94113	316.0	12.1
42	.96393	325.0	52.9	.95286	316.4	27.2	.94279	316.7	13.1
43	.96393	325.0	52.3	.95330	316.6	27.6	.94352	316.9	13.7
44	.96351	324.9	53.1	.95286	316.5	28.6	.94322	316.9	13.7
45	.96378	324.9	52.7	.95315	316.5	28.6	.94381	317.0	12.5
46	.96393	324.9	52.5	.95330	316.6	28.6	.94410	317.1	13.5
47	.96421	325.0	51.7	.95359	316.6	27.6	.94454	317.2	13.7
48	.96435	325.1	52.5	.95381	316.7	27.8	.94469	317.3	14.5
49	.96421	325.1	52.3	.95396	316.7	27.4	.94460	317.3	14.1
50	.96406	325.1	52.5	.95418	316.9	28.0	.94454	317.3	13.9
51	.96378	325.0	52.9	.95404	316.9	28.4	.94432	317.2	13.7
52	.96442	325.2	53.1	.95492	317.2	29.0	.94518	317.5	13.5
53	.96442	325.2	51.5	.95729	317.9	27.4	.94696	318.1	12.3
54	.96815	326.4	51.7	.95293	316.5	27.0	.94049	316.1	12.9
55	.96745	326.1	51.1	.95197	316.1	27.6	.94055	316.0	12.7
56	.96703	325.9	50.3	.95138	316.0	27.8	.94049	316.1	12.9
57	.96730	325.7	48.0	.95190	316.2	27.6	.94062	316.1	13.7
58	.96800	326.0	48.0	.95256	316.4	28.2	.94004	316.0	15.1
59	.96828	326.5	49.6	.95256	316.7	29.6	.93816	315.6	16.5
60	.96885	326.6	50.0	.95359	316.9	29.2	.93468	314.5	17.2
61	.96582	325.6	51.5	.95041	315.6	27.6	.93946	315.6	13.5
62	.96569	325.3	49.2	.95028	315.5	27.6	.93967	315.7	13.1
63	.96611	325.5	49.2	.95087	315.9	28.6	.93982	315.9	13.7
64	.96674	325.8	50.0	.95131	316.2	29.8	.93743	315.2	15.7
65	.96569	325.4	49.6	.95028	315.6	27.4	.93982	315.7	12.7
66	.96659	325.8	50.0	.95124	316.2	29.6	.93728	315.2	15.3
67	.96505	325.3	51.5	.94991	315.4	27.0	.93909	315.5	12.7
68	.96505	325.2	50.5	.94962	315.4	28.2	.93932	315.6	13.3
69	.96547	325.4	49.0	.95021	315.7	28.0	.93954	315.8	13.5
70	.96562	325.3	49.4	.95028	315.7	29.8	.93831	315.5	14.1
71	.96653	325.9	50.9	.95100	316.2	30.4	.93728	315.3	16.1
72	.96716	326.0	50.7	.95227	316.5	29.8	.93562	314.8	16.1
73	.96554	326.1	55.4	.94991	316.0	30.8	.93244	313.9	18.2
74	.96505	325.1	49.6	.94975	315.3	27.0	.93946	315.6	13.7
75	.96639	325.7	50.0	.95087	316.1	29.8	.93700	315.2	16.8
76	.96463	325.1	50.3	.94962	315.2	26.8	.93903	315.4	12.9
77	.96505	325.2	51.3	.94953	315.5	28.8	.93961	315.7	13.9
78	.96576	325.4	48.4	.95050	315.8	28.8	.93670	315.0	15.3
79	.96448	324.9	49.4	.94903	315.1	27.8	.93924	315.5	13.1
80	.96576	325.4	49.0	.95050	315.9	29.2	.93685	315.1	16.1
81	.96371	324.7	50.9	.94857	315.0	27.6	.93874	315.4	13.5
82	.96569	325.4	49.6	.95041	315.9	29.8	.93685	315.1	15.5
83	.96400	324.9	51.1	.94887	315.0	27.0	.93881	315.3	12.5
84	.96406	324.8	50.0	.94887	315.1	27.2	.93909	315.5	12.9
85	.96435	324.8	49.2	.94931	315.3	28.0	.93903	315.6	14.1
86	.96483	325.0	49.4	.94931	315.4	29.2	.93786	315.3	13.9
87	.96477	325.2	50.3	.94975	315.7	29.6	.93614	314.8	15.7
88	.96547	325.4	49.8	.95094	316.0	29.0	.93453	314.4	16.5
89	.96569	325.7	51.5	.95065	316.0	29.2	.93287	313.9	17.6
90	.96448	325.6	54.5	.94879	315.5	30.2	.93207	313.7	17.6
91	.96435	325.0	51.5	.94984	315.5	28.2	.93976	315.9	14.3
92	.96547	325.5	51.3	.95065	316.0	30.4	.93685	315.2	16.3

[a] h measured in J/m²-sec-°K.

TABLE III.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND FOR PLATE WITH RAMP WITHOUT STRINGERS - Continued

(a) Configuration 1; P_1 - Concluded

Thermocouple	M = 2.49; T_t = 403° K; p_t = 155 994 N/m²				M = 3.51; T_t = 394° K; p_t = 257 356 N/m²				M = 4.44; T_t = 378° K; p_t = 414 356 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)		$\frac{T_e}{T_t}$	T_w, °K	h (a)		$\frac{T_e}{T_t}$	T_w, °K	h (a)	
93	.96400	325.0	51.9		.94975	315.4	28.2		.93924	315.5	12.5	
94	.96421	324.9	50.3		.94931	315.4	28.0		.93954	315.6	12.5	
95	.96442	324.9	49.8		.94953	315.5	28.6		.93896	315.6	15.3	
96	.96470	325.0	49.6		.94931	315.6	30.0		.93773	315.3	15.9	
97	.96329	323.0	36.6		.95087	315.0	22.3		.93670	314.5	11.6	
98	.96492	325.5	52.9		.95034	316.1	30.8		.93352	314.2	18.0	
99	.96477	325.5	53.5		.94931	315.7	30.4		.93199	313.7	17.2	
100	.96336	325.2	55.2		.94681	314.9	31.1		.93141	313.5	18.2	
101	.96323	324.5	50.9		.94866	314.9	27.4		.93939	315.5	12.9	
102	.96448	325.2	52.1		.94991	315.8	30.4		.93591	314.9	16.8	
103	.96329	325.0	52.7		.94925	315.3	28.2		.94004	315.8	13.5	
104	.96308	324.6	51.7		.94857	315.1	28.8		.93961	315.7	13.9	
105	.96323	324.6	51.1		.94857	315.2	29.8		.93851	315.5	15.1	
106	.96421	325.1	52.7		.94975	315.8	30.8		.93547	314.7	16.5	
107	.96393	325.3	54.1		.94784	315.2	30.6		.93186	313.6	18.2	
108	.96294	324.7	53.1		.95094	316.0	29.2		.94221	316.6	13.3	
109	.96421	325.1	51.5		.95006	315.9	30.4		.93599	314.8	16.8	
110	.96336	324.9	52.7		.95242	316.6	29.2		.94381	317.2	15.9	
111	.96393	324.9	50.7		.95234	316.5	29.2		.94337	317.1	15.1	
112	.96351	324.7	50.9		.95050	315.9	29.2		.94049	316.1	15.9	
113	.96413	325.1	50.9		.95021	315.9	30.4		.93859	315.7	15.3	
114	.96421	325.2	52.3		.95050	316.1	30.6		.93627	315.1	16.5	
115	.96400	325.3	53.3		.94969	315.9	31.7		.93367	314.3	17.6	
116	.96365	325.2	54.3		.94754	315.2	31.5		.93235	313.9	18.8	
117	.96646	326.1	54.1		.95205	315.8	25.5		.93954	315.5	12.3	
118	.96674	325.8	50.0		.95041	315.3	25.7		.93903	315.1	11.0	
119	.96547	325.4	49.0		.95080	315.5	26.4		.93918	315.2	11.4	
120	.96569	325.4	49.6		.95013	315.3	26.4		.93932	315.2	10.2	
121	.96477	325.2	50.3		.94938	315.1	27.0		.93874	315.0	10.0	
122	.96448	325.2	52.1		.94120	313.2	35.1		.92932	312.2	14.3	
123	.96421	325.1	51.5		.93987	312.0	28.6		.93222	313.0	13.3	

[a] h measured in J/m²-sec-°K.

TABLE III.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND FOR PLATE WITH RAMP WITHOUT STRINGERS - Continued

(b) Configuration 2; $P_1 + R_1$

Thermocouple	M = 2.49; T_t = 403° K; p_t = 153 744 N/m²			M = 3.51; T_t = 397° K; p_t = 258 601 N/m²			M = 4.44; T_t = 379° K; p_t = 416 175 N/m²		
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{T_e}{T_t}$	T_w, °K	h (a)
1	.96571	325.4	49.2	.94627	314.4	25.9	.93931	313.7	13.1
2	.96544	325.5	50.9	.94590	314.4	27.2	.93939	313.7	13.5
3	.96677	325.7	49.4	.94671	314.5	26.6	.94085	313.9	13.5
4	.96621	325.4	48.2	.94634	314.3	25.7	.94069	313.8	12.7
5	.96558	325.4	50.0	.94568	314.1	26.6	.94013	313.7	13.1
6	.96516	325.4	51.5	.94546	314.2	27.6	.93983	313.6	13.3
7	.96474	325.1	50.0	.94509	313.9	26.4	.93954	313.6	13.7
8	.96459	324.9	49.8	.94472	313.7	26.8	.93924	313.4	13.9
9	.96430	325.0	50.9	.94459	313.7	26.8	.93902	313.4	13.9
10	.96395	324.8	49.8	.94443	313.7	27.4	.93896	313.4	13.5
11	.96403	324.7	50.7	.94443	313.6	26.8	.93909	313.4	13.5
12	.96340	324.7	51.5	.94376	313.5	28.0	.93837	313.1	13.7
13	.96375	325.1	52.1	.94428	313.9	28.6	.93887	313.4	14.7
15	.96318	324.8	52.3	.94376	313.6	28.4	.93851	313.2	13.1
16	.96410	325.0	51.1	.94443	313.7	27.2	.93917	313.3	13.9
17	.96388	324.9	51.1	.94421	313.7	27.6	.93909	313.4	14.5
18	.96346	324.7	51.3	.94391	313.6	27.8	.93881	313.2	13.3
19	.96305	324.6	51.5	.94362	313.6	27.6	.93866	313.2	13.7
20	.96289	324.6	51.9	.94362	313.5	27.6	.93866	313.2	13.1
21	.96276	324.5	52.1	.94347	313.6	27.6	.93866	313.1	14.5
22	.96283	324.6	52.5	.94362	313.6	27.8	.93881	313.2	13.9
23	.96283	324.5	51.9	.94354	313.5	27.0	.93866	313.2	13.1
24	.96269	324.5	52.1	.94354	313.4	27.4	.93866	313.2	13.3
25	.96333	324.6	51.3	.94399	313.5	27.0	.93924	313.4	13.3
26	.96417	324.9	50.7	.94502	313.8	26.8	.94048	313.6	12.5
27	.96388	324.6	49.6	.94480	313.7	26.6	.94026	313.6	13.3
28	.96388	324.7	49.6	.94502	313.9	26.8	.94056	313.7	13.7
29	.96474	325.2	53.5	.94693	314.7	28.6	.94115	314.1	14.5
30	.96410	325.0	52.9	.94612	314.4	28.2	.94041	313.8	14.1
31	.96375	325.0	52.7	.94518	314.0	27.6	.93983	313.6	13.9
32	.96360	324.9	52.5	.94518	314.0	27.4	.93983	313.6	14.1
33	.96325	324.7	52.1	.94443	313.8	27.4	.93968	313.5	12.9
34	.96395	325.0	51.7	.94502	314.0	27.2	.94091	313.9	13.9
35	.96459	325.1	51.3	.94531	314.1	27.4	.94136	314.0	13.7
36	.96375	324.8	50.5	.94480	313.9	26.6	.94106	313.9	13.1
37	.96360	324.8	51.9	.94502	314.0	27.8	.94115	314.0	13.9
38	.96333	324.7	52.3	.94459	313.9	27.8	.94085	313.8	13.9
39	.96333	324.8	52.1	.94428	313.9	27.6	.94069	313.8	13.7
40	.96192	324.2	52.3	.94310	313.4	27.8	.93909	313.3	13.7
41	.96212	324.5	53.7	.94332	313.6	28.0	.93946	313.4	14.1
42	.96305	324.7	52.7	.94413	313.8	27.8	.94056	313.7	13.7
43	.96318	324.7	51.9	.94443	313.9	27.2	.94085	313.8	13.9
44	.96283	324.6	52.5	.94391	313.7	27.6	.94048	313.7	13.5
45	.96305	324.5	51.9	.94406	313.7	27.4	.94085	313.9	13.5
46	.96325	324.6	51.5	.94450	313.7	27.0	.94121	313.9	13.7
47	.96388	324.8	51.7	.94472	313.9	27.6	.94186	314.1	13.9
48	.96466	325.1	51.7	.94494	314.0	28.0	.94232	314.2	13.3
49	.96952	326.7	51.7	.94553	314.2	27.6	.94318	314.5	13.9
50	.97121	329.1	66.0	.95114	315.8	26.4	.94800	316.0	12.5
51	.97656	330.2	60.3	.95799	322.5	33.7	.95643	320.0	18.0
54	.96558	325.5	50.5	.94590	314.4	27.8	.93968	313.9	13.5
55	.96536	325.4	50.5	.94509	314.1	27.8	.94013	313.9	13.7
56	.96494	325.0	49.2	.94428	314.0	27.8	.93998	314.0	15.1
57	.96516	324.8	47.2	.94502	314.1	28.4	.94013	314.0	15.1
58	.96586	325.0	47.0	.94590	314.5	29.2	.93968	314.0	16.1
59	.96615	325.5	48.2	.94605	314.9	30.4	.93792	313.6	16.8
60	.96685	325.6	49.4	.94680	315.0	29.4	.93458	312.5	17.4
61	.96410	324.9	50.9	.94399	313.7	28.4	.93917	313.5	14.1
62	.96403	324.6	49.2	.94354	313.6	27.4	.93939	313.6	13.7
63	.96445	324.7	48.6	.94428	314.0	29.0	.93961	313.9	14.9
64	.96529	325.0	48.6	.94531	314.5	30.2	.93749	313.4	17.2
65	.96395	324.6	49.0	.94369	313.7	28.8	.93974	313.7	13.9
66	.96529	325.0	49.2	.94509	314.5	30.6	.93749	313.3	16.8
67	.96353	324.7	51.1	.94354	313.6	27.8	.93909	313.4	13.5
68	.96360	324.6	50.3	.94310	313.6	28.6	.93939	313.6	14.3
69	.96417	324.6	48.4	.94399	313.9	28.6	.93939	313.7	13.7
70	.96445	324.6	48.6	.94428	314.1	29.6	.93851	313.6	15.5
71	.96529	325.1	49.4	.94518	314.5	30.8	.93755	313.4	17.8
72	.96564	325.2	48.8	.94605	314.7	30.2	.93595	312.9	18.6
73	.96430	325.4	53.9	.94317	314.1	31.5	.93268	312.0	19.0
74	.96360	324.5	49.4	.94332	313.6	28.2	.93968	313.6	14.9
75	.96516	325.0	49.4	.94518	314.5	30.4	.93742	313.2	17.0
76	.96333	324.5	49.8	.94340	313.5	27.8	.93909	313.4	14.1
77	.96382	324.6	50.5	.94332	313.6	28.4	.93946	313.7	14.5
78	.96445	324.6	47.4	.94472	314.2	29.4	.93690	313.1	16.8
79	.96318	324.3	49.4	.94281	313.4	28.0	.93924	313.5	14.3
80	.96459	324.7	48.2	.94472	314.3	30.2	.93720	313.2	17.2
81	.96234	324.1	50.0	.94229	313.2	29.4	.93881	313.4	14.9
82	.96474	324.7	48.8	.94480	314.4	29.8	.93720	313.2	16.5
83	.96269	324.4	50.7	.94303	313.4	27.6	.93909	313.4	13.9
84	.96305	324.3	49.4	.94281	313.4	28.2	.93939	313.5	14.1
85	.96340	324.2	48.4	.94340	313.6	29.0	.93931	313.6	14.7
86	.96395	324.4	48.0	.94384	313.9	29.2	.93837	313.4	15.5
87	.96395	324.5	48.8	.94428	314.1	30.2	.93662	313.0	17.4
88	.96452	324.7	48.8	.94509	314.4	29.0	.93517	312.5	18.0
89	.96487	325.1	50.3	.94450	314.2	29.8	.93333	312.0	18.2
90	.96375	325.0	53.3	.94259	313.7	30.4	.93283	311.9	18.8
91	.96367	324.6	50.7	.94391	313.7	29.0	.94013	313.8	15.1
92	.96466	324.9	49.4	.94524	314.5	30.2	.93735	313.4	17.4
93	.96340	324.6	50.9	.94391	313.7	28.4	.93983	313.7	14.3
94	.96333	324.4	49.8	.94354	313.7	29.0	.93983	313.7	14.5

[a] h measured in J/m²-sec-°K.

TABLE III.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND FOR PLATE WITH RAMP WITHOUT STRINGERS - Continued

(b) Configuration 2; $P_1 + R_1$ - Concluded

Thermo-couple	M = 2.49; T_t = 403° K; p_t = 153 744 N/m²				M = 3.51; T_t = 397° K; p_t = 258 601 N/m²				M = 4.44; T_t = 379° K; p_t = 416 175 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)		$\frac{T_e}{T_t}$	T_w, °K	h (a)		$\frac{T_e}{T_t}$	T_w, °K	h (a)	
95	.96346	324.4	49.2		.94376	313.9	30.2		.93917	313.6	15.9	
96	.96375	324.5	48.6		.94399	314.0	30.6		.93801	313.4	16.3	
97	.96283	322.5	35.3		.94509	313.2	22.7		.93690	312.5	13.3	
98	.96417	324.9	50.9		.94487	314.5	30.6		.93428	312.4	18.4	
99	.96417	325.0	51.5		.94354	314.0	31.1		.93268	311.9	18.4	
100	.96263	324.7	53.5		.94089	313.2	31.1		.93224	311.7	18.8	
101	.96263	324.2	50.3		.94296	313.4	28.4		.93983	313.6	14.5	
102	.96388	324.7	50.7		.94459	314.4	31.1		.93669	313.1	18.4	
103	.96254	324.6	52.3		.94303	313.6	29.6		.94004	313.7	14.5	
104	.96219	324.2	50.9		.94281	313.5	29.2		.93961	313.6	15.5	
105	.96254	324.2	50.5		.94325	313.7	29.8		.93887	313.5	14.9	
106	.96367	324.7	51.1		.94459	314.3	30.6		.93618	313.0	17.6	
107	.96340	324.8	52.7		.94214	313.5	30.6		.93246	311.9	19.2	
108	.96212	324.2	51.5		.94296	313.4	29.0		.94013	313.7	14.5	
109	.96346	324.5	50.0		.94459	314.3	31.5		.93632	312.9	18.8	
110	.97614	330.0	59.0		.95696	319.6	4C.0		.95601	319.8	18.2	
111	.97684	329.9	57.2		.95777	321.9	36.4		.95650	319.9	17.8	
112	.97691	331.2	53.3		.95770	321.9	36.4		.95573	319.5	16.5	
113	.97755	331.4	53.1		.95858	322.9	34.1		.95503	319.4	17.0	
114	.97726	329.9	56.6		.95858	321.4	37.6		.95264	318.7	19.0	
115	.97671	329.8	55.8		.95748	321.0	37.2		.95003	318.0	19.8	
116	.97614	329.8	57.4		.95541	320.4	37.4		.94888	317.7	20.8	
117	.96430	325.4	54.1		.94568	314.1	27.0		.93998	313.4	12.3	
118	.96529	325.0	48.6		.94531	314.5	28.8		.93749	313.4	17.2	
119	.96417	324.6	48.4		.94399	313.9	28.6		.93939	313.7	13.7	
120	.96474	324.7	48.8		.94480	314.4	29.8		.93720	313.2	16.5	
121	.96395	324.5	48.8		.94428	314.1	30.2		.93662	313.0	17.4	
122	.96388	324.7	50.7		.94459	314.4	31.1		.93669	313.1	18.4	
123	.96346	324.5	50.0		.94459	314.3	31.5		.93632	312.9	18.8	
150	.98127	335.9	94.2		.95821	322.9	61.3		.94646	318.9	39.0	
151	.97854	335.4	103.4		.95482	322.2	64.3		.94245	317.9	41.3	
152	.97601	335.0	106.2		.95261	322.2	69.7		.93998	317.6	46.4	
153	.97473	334.7	104.8		.95166	322.3	73.5		.93872	317.5	48.4	
154	.97346	334.4	106.2		.95070	322.3	77.0		.93755	317.4	51.3	
155	.97240	334.3	109.3		.94930	322.2	8C.7		.93552	317.2	56.2	
156	.97255	334.7	118.1		.94892	322.4	82.9		.93391	317.1	58.6	
157	.97346	334.0	101.9		.95048	322.2	75.8		.93573	317.2	53.7	
158	.97889	335.0	95.0		.95409	322.1	65.6		.94208	318.0	42.9	
159	.97896	335.0	93.4		.95365	322.7	71.9		.93896	318.0	50.9	
160	.97882	335.2	99.5		.95320	323.0	72.5		.93318	317.1	58.4	
161	.97825	335.2	101.7		.95114	322.6	75.0		.92954	316.2	62.1	
162	.97473	334.5	103.2		.95092	322.2	75.6		.93807	317.6	50.7	
163	.97564	334.4	96.8		.95151	322.6	75.4		.93764	317.8	52.3	
164	.97522	334.1	98.9		.95039	322.6	8C.7		.93443	317.4	59.6	
165	.97473	334.1	100.1		.94989	322.8	83.1		.93042	316.9	66.6	
166	.97410	334.2	102.1		.94914	322.9	84.8		.92604	316.0	73.1	
167	.97854	334.4	73.1		.95600	323.6	59.6		.93421	316.6	50.5	
168	.97374	334.0	102.3		.94892	322.9	86.6		.92895	316.7	70.1	
169	.97233	333.5	103.4		.94693	322.4	88.5		.92735	316.4	72.1	
170	.97205	334.4	108.5		.94746	322.4	85.8		.93289	317.1	61.1	
171	.97311	333.5	101.7		.94768	322.0	84.2		.93283	317.0	62.5	
172	.97135	333.3	104.2		.94590	322.1	88.5		.92925	316.6	68.0	
173	.97150	333.0	98.9		.94605	321.9	86.8		.92698	316.2	69.7	
174	.97009	333.4	106.4		.94384	322.0	92.3		.92137	315.2	79.9	
175	.96952	333.1	111.1		.94222	321.3	90.7		.91699	314.0	81.9	
176	.97755	335.7	104.4		.95608	321.9	61.9		.94377	317.4	34.5	
177	.97311	334.7	110.9		.95284	321.7	69.7		.94056	317.9	37.8	

[a] h measured in J/m²-sec-°K.

TABLE III.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND FOR PLATE WITH RAMP WITHOUT STRINGERS - Continued

(c) Configuration 3; $P_1 + M_3$

Thermocouple	M = 2.49; T_t = 397° K; p_t = 155 515 N/m²				M = 3.51; T_t = 395° K; p_t = 257 500 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$
1	.97385	324.5	50.0	1.00	.96169	319.7	23.9	.95
2	.97321	324.5	51.7	1.00	.96079	319.6	24.5	.92
3	.97399	324.5	49.8	.99	.96139	319.7	24.1	.94
4	.97343	324.1	48.4	.99	.96095	319.4	23.3	.93
5	.97263	324.1	50.0	.99	.95992	319.2	24.3	.92
6	.97228	324.1	51.5	.99	.95948	319.1	24.9	.95
7	.97172	323.8	49.6	.98	.95889	318.9	23.7	.91
8	.97143	323.6	50.9	1.00	.95845	318.7	24.3	.94
9	.97100	323.6	51.1	1.00	.95799	318.6	24.3	.92
10	.97071	323.4	51.1	1.00	.95755	318.5	24.1	.91
11	.97049	323.2	49.6	.98	.95727	318.4	24.7	.95
12	.96978	323.2	51.3	.99	.95674	318.2	24.9	.95
13	.97014	323.6	52.9	1.00	.95727	318.5	24.5	.90
14	.93225	324.5	88.0		.95645	318.0	24.1	
15	.96942	323.2	52.3	.99	.95652	318.2	24.5	.90
16	.96993	323.3	51.3	.98	.95689	318.2	24.9	.94
17	.96958	323.3	52.3	1.00	.95652	318.2	25.9	.95
18	.97000	323.3	51.7	.99	.95674	318.2	24.5	.92
39	.94952	325.0	122.8	2.31	.92002	308.6	44.1	1.66
40	.94329	325.4	126.4	2.39	.90992	305.3	44.1	1.65
41	.93944	323.9	126.2	2.35	.90151	302.5	43.3	1.62
42	.93907	320.6	117.3	2.22	.89724	300.9	42.7	1.57
43	.94019	320.3	111.9	2.14	.89665	300.7	42.9	1.56
44	.94173	320.6	109.3	2.06	.89857	301.5	44.3	1.55
45	.94470	321.1	106.0	2.01	.90313	303.1	44.7	1.56
46	.94737	321.7	103.0	1.96	.90756	304.7	45.4	1.59
47	.94967	322.2	100.7	1.95	.91110	305.9	45.1	1.64
48	.95205	323.0	100.1	1.91	.91441	307.3	47.0	1.69
49	.95368	323.5	98.9	1.89	.91715	308.2	47.8	1.75
50	.95522	323.9	98.3	1.87	.91980	309.1	47.8	1.71
51	.95619	324.2	97.0	1.83	.92128	309.7	48.4	1.71
52	.95819	324.7	96.8	1.82	.92400	310.6	48.2	1.66
53	.96138	325.5	92.7	1.80	.93086	312.7	46.0	1.68
54	.97406	324.7	50.5	.98	.96125	319.8	24.7	.92
55	.97299	324.3	51.3	1.00	.95976	319.2	24.7	.90
56	.97285	324.1	50.0	1.00	.95889	319.0	25.3	.91
57	.97350	324.1	48.0	1.00	.95961	319.2	24.7	.90
58	.97414	324.2	47.6	.99	.96007	319.4	25.3	.90
59	.97457	324.6	47.8	.96	.95992	319.7	27.4	.92
60	.97513	324.8	47.2	.94	.96079	319.9	27.0	.92
61	.97114	323.7	51.3	1.00	.95755	318.6	25.3	.92
62	.97129	323.5	49.4	1.00	.95727	318.4	25.5	.93
63	.97192	323.7	49.4	1.00	.95786	318.7	25.9	.91
64	.97285	324.0	49.4	.99	.95814	319.1	28.0	.94
65	.97129	323.5	49.8	1.00	.95703	318.4	25.1	.92
66	.97263	324.0	48.4	.97	.95770	319.0	27.2	.92
67	.97029	323.3	50.7	.98	.95652	318.2	25.9	.96
68	.97058	323.3	50.5	1.00	.95624	318.2	25.9	.92
69	.97121	323.5	48.4	.99	.95711	318.5	26.4	.94
70	.97143	323.4	48.4	.98	.95667	318.5	27.2	.91
71	.97250	324.1	49.4	.97	.95762	319.0	27.8	.91
72	.97328	324.2	48.8	.96	.95873	319.2	27.4	.92
73	.97185	324.4	52.1	.94	.95608	318.6	28.6	.93
74	.97043	323.0	49.8	1.00	.95608	318.1	25.1	.93
75	.97214	323.9	48.6	.97	.95727	318.7	27.8	.93
76	.97100	323.4	50.0	1.00	.95711	318.3	24.9	.93
77	.97049	323.4	50.9	.99	.95608	318.2	26.4	.91
78	.97156	323.5	47.6	.98	.95683	318.4	26.6	.92
79	.97350	324.1	49.6	1.00	.95727	318.4	24.7	.89
80	.97172	323.5	48.6	.99	.95667	318.5	27.2	.93
81	.97506	325.2	54.3	1.07	.96110	320.7	31.7	1.15
82	.97143	323.5	48.6	.98	.95652	318.5	28.0	.94
83	.98532	334.7	86.6	1.70	.97347	328.5	47.4	1.76
84	.98069	328.0	61.5	1.23	.96780	322.8	32.5	1.20
85	.97606	325.4	53.1	1.08	.96248	321.0	31.3	1.12
86	.97513	324.9	50.0	1.01	.95689	318.4	26.1	.90
87	.97078	323.4	48.8	.97	.95586	318.2	26.6	.90
88	.97143	323.6	48.2	.97	.95711	318.6	26.8	.92
89	.97172	323.8	48.8	.95	.95659	318.5	27.0	.92
90	.97043	323.7	51.3	.94	.95446	317.9	28.0	.93
91	.97129	325.7	68.2	1.33	.95808	320.9	40.0	1.42
92	.97584	325.4	51.5	1.00	.96213	321.0	31.7	1.04
93	.96493	318.2	21.2	.41	.95727	315.9	7.1	.25
94	.96204	321.0	55.6	1.11	.95431	318.7	33.5	1.20
95	.96751	323.4	59.6	1.20	.95645	319.7	36.6	1.28
96	.97000	323.6	55.2	1.11	.96007	320.0	30.4	1.01
97	.97250	322.2	36.4	.99	.95933	318.2	20.0	.90
98	.97457	325.0	51.1	.97	.96051	320.4	31.1	1.01
99	.97513	325.4	53.1	.99	.95858	319.4	28.2	.93
100	.97256	324.7	54.7	.99	.95254	317.4	28.8	.93
101	.96612	320.6	39.4	.78	.95718	316.9	15.3	.56
102	.96915	322.7	49.4	.95	.95830	319.1	27.2	.89
103	.94144	316.5	73.9	1.40	.93329	310.5	26.8	.95
104	.95945	318.9	44.9	.87	.95092	315.4	20.2	.70
105	.95634	317.6	41.5	.81	.94281	313.6	25.7	.86
106	.96493	321.0	46.0	.87	.95387	317.3	25.3	.82
107	.97136	323.7	49.4	.91	.95830	319.2	28.6	.93
108	.93649	315.5	81.7	1.54	.92512	308.6	32.3	1.10
109	.96233	319.6	41.7	.81	.95114	316.2	23.9	.79
110	.95137	320.3	78.6	1.49	.92422	308.6	34.5	1.18
111	.94374	316.1	66.8	1.32	.94783	314.9	24.1	.83
112	.95344	317.6	49.4	.97	.95004	315.7	23.9	.82
113	.96567	320.5	39.2	.77	.94487	313.5	21.0	.69
114	.96627	321.3	44.1	.84	.94989	315.6	22.7	.74
115	.96433	320.6	43.9	.82	.95276	317.0	25.3	.80
116	.96642	321.7	46.4	.85	.95475	318.1	29.0	.92
117	.97121	324.1	54.5	1.01	.95948	319.1	23.7	.93

[a] h measured in J/m²-sec-°K

TABLE III.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND FOR PLATE WITH RAMP WITHOUT STRINGERS - Continued

(d) Configuration 4; $P_1 + R_1 + M_3$

Thermocouple	M = 2.49; T_t = 399° K; p_t = 155 276 N/m²				M = 3.51; T_t = 396° K; p_t = 257 117 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$
1	.96986	324.5	49.6	1.01	.96278	319.7	23.3	.90
2	.96929	324.5	51.5	1.01	.96207	319.7	24.3	.89
3	.97006	324.6	49.4	1.00	.96278	319.8	23.7	.89
4	.96944	324.2	48.2	1.00	.96221	319.5	22.7	.88
5	.96886	324.2	50.5	1.01	.96120	319.3	24.3	.92
6	.96844	324.3	51.9	1.01	.96061	319.2	24.7	.90
7	.96802	324.0	50.3	1.00	.96017	319.0	23.9	.91
8	.96773	323.9	50.7	1.02	.95973	318.7	24.1	.90
9	.96738	323.9	50.7	1.00	.95920	318.6	24.1	.90
10	.96723	323.7	50.9	1.02	.95890	318.6	23.9	.87
11	.96723	323.6	50.3	.99	.95870	318.5	23.1	.86
12	.96645	323.5	51.5	1.00	.95811	318.3	24.3	.87
13	.96680	323.9	53.1	1.02	.95839	318.6	24.7	.86
15	.96616	323.6	52.5	1.00	.95780	318.3	24.9	.88
16	.96660	323.6	51.5	1.01	.95818	318.4	24.9	.92
17	.96645	323.6	52.3	1.02	.95796	318.4	24.7	.90
18	.96680	323.7	51.7	1.01	.95818	318.4	24.7	.89
39	.94818	331.0	124.6	2.39	.92140	308.4	44.1	1.60
40	.94191	328.6	124.0	2.37	.91108	305.0	44.7	1.61
41	.93793	327.1	123.4	2.30	.90268	302.2	43.5	1.55
42	.93719	326.3	118.3	2.24	.89839	300.6	43.5	1.57
43	.93815	325.9	112.8	2.17	.89795	300.4	42.7	1.57
44	.93977	321.3	112.4	2.14	.89988	301.2	44.9	1.63
45	.94272	321.9	107.9	2.08	.90421	302.8	44.3	1.62
46	.94516	322.4	105.8	2.06	.90864	304.4	45.8	1.70
47	.94759	322.9	102.3	1.98	.91225	305.6	46.6	1.69
48	.95002	323.7	103.0	1.99	.91557	306.9	48.2	1.72
49	.95253	324.3	101.5	1.96	.91860	308.0	48.4	1.76
50	.95799	325.7	98.3	1.49	.92308	309.5	47.8	1.81
51	.97070	336.1	103.2	1.71	.94086	316.6	46.8	1.39
54	.96971	324.7	50.3	1.00	.96221	319.9	24.3	.88
55	.96922	324.4	50.7	1.00	.96098	319.4	24.5	.88
56	.96873	324.1	49.8	1.01	.96017	319.2	24.9	.90
57	.96900	324.1	48.4	1.03	.96067	319.4	24.7	.87
58	.96971	324.3	48.0	1.02	.96104	319.5	25.9	.89
59	.97021	324.7	48.8	1.01	.96076	319.7	27.2	.89
60	.97099	324.9	49.4	1.00	.96164	319.9	26.8	.91
61	.96744	323.9	51.3	1.01	.95890	318.7	24.9	.88
62	.96744	323.6	49.4	1.00	.95855	318.6	25.1	.92
63	.96780	323.9	49.4	1.02	.95905	318.9	25.9	.89
64	.96886	324.1	50.0	1.03	.95899	319.1	27.2	.90
65	.96738	323.6	49.8	1.02	.95839	318.6	24.7	.86
66	.96851	324.2	50.0	1.02	.95861	319.0	27.2	.89
67	.96660	323.6	50.9	1.00	.95802	318.4	27.4	.99
68	.96687	323.6	50.5	1.00	.95765	318.4	25.1	.88
69	.96723	323.7	48.6	1.00	.95811	318.6	25.3	.89
70	.96758	323.6	48.4	1.00	.95780	318.6	26.4	.89
71	.96864	324.2	50.9	1.03	.95839	319.0	27.6	.89
72	.96929	324.3	50.7	1.04	.95942	319.2	27.0	.89
73	.96773	324.5	55.2	1.02	.95699	318.7	27.4	.87
74	.96680	323.4	49.2	1.00	.95736	318.2	25.5	.91
75	.96836	324.1	49.8	1.01	.95811	318.8	28.0	.92
76	.96758	323.7	49.8	1.00	.95855	318.5	24.5	.88
77	.96702	323.6	50.7	1.00	.95721	318.4	25.1	.88
78	.96787	323.7	48.6	1.03	.95752	318.5	26.8	.91
79	.96986	324.4	49.4	1.00	.95861	318.6	24.9	.89
80	.96773	323.7	49.2	1.02	.95752	318.5	27.2	.90
81	.97156	325.6	54.5	1.09	.96236	320.9	31.3	1.06
82	.96773	323.7	49.6	1.02	.95752	318.5	27.2	.91
83	.98276	333.0	90.3	1.78	.97519	327.4	49.4	1.79
84	.97795	328.4	60.9	1.23	.96888	322.9	31.5	1.12
85	.97270	325.7	52.1	1.08	.96356	321.1	30.4	1.05
86	.97156	325.2	50.7	1.06	.95796	318.5	25.9	.89
87	.96716	323.6	50.3	1.03	.95669	318.3	26.4	.87
88	.96751	323.7	49.6	1.02	.95774	318.6	26.6	.92
89	.96780	324.1	51.7	1.03	.95728	318.6	26.8	.90
90	.96674	323.9	53.7	1.01	.95531	317.9	27.4	.90
91	.96822	326.0	67.4	1.33	.95920	320.9	40.2	1.39
92	.97227	325.7	52.5	1.06	.96300	321.1	31.7	1.05
93	.95873	317.7	21.9	.43	.96008	316.7	6.7	.24
94	.95910	321.5	55.6	1.11	.95544	318.7	33.5	1.15
95	.96425	323.8	60.3	1.22	.95752	319.7	35.7	1.18
96	.96660	324.0	55.2	1.13	.96104	320.1	30.6	1.00
97	.96758	322.1	36.4	1.03	.96017	318.4	19.8	.87
98	.97099	325.2	52.3	1.03	.96135	320.4	31.1	1.01
99	.97156	325.7	54.5	1.06	.95958	319.4	27.6	.89
100	.96873	324.9	57.0	1.06	.95360	317.5	28.4	.91
101	.96255	320.9	39.6	.79	.95905	317.2	15.1	.53
102	.96560	323.0	49.4	.98	.95942	319.1	26.6	.86
103	.94029	317.0	73.7	1.41	.93458	310.6	26.6	.90
104	.95644	319.3	44.5	.88	.95250	315.6	19.2	.66
105	.95275	317.9	41.1	.81	.94395	313.7	25.1	.84
106	.96145	321.3	46.0	.90	.95500	317.4	25.7	.84
107	.96773	324.0	51.5	.98	.95905	319.3	28.8	.94
108	.93506	316.2	82.1	1.60	.92611	308.6	31.9	1.10
109	.96474	321.8	41.1	.82	.95213	316.3	23.9	.76
110	.96532	332.6	89.9	1.52	.94395	317.9	45.8	1.14
111	.97099	326.7	62.9	1.10	.97058	323.4	26.1	.72
112	.97808	327.7	49.4	.93	.97171	322.7	24.9	.69
113	.98085	329.4	46.6	.88	.96661	321.0	23.1	.68
114	.97638	326.7	48.2	.85	.96859	322.8	30.8	.82

[a] h measured in J/m²-sec-°K.

TABLE III.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND FOR PLATE WITH RAMP WITHOUT STRINGERS - Continued

(d) Configuration 4; $P_1 + R_1 + M_3$ - Concluded

Thermo-couple	M = 2.49; T_t = 399° K; p_t = 155 276 N/m^2				M = 3.51; T_t = 396° K; p_t = 257 117 N/m^2			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$
115	.97396	325.9	49.2	.88	.96866	325.4	28.6	.77
116	.97815	327.4	49.8	.87	.97016	325.1	33.7	.90
117	.96744	324.2	54.1	1.00	.96104	319.1	24.5	.91
150	.98659	341.7	169.6	1.80	.96504	328.0	80.3	1.31
151	.98531	348.4	162.0	1.57	.96179	327.2	83.6	1.30
152	.98460	342.0	166.1	1.56	.96091	327.7	88.0	1.26
153	.98504	341.9	164.7	1.57	.96001	327.7	91.7	1.25
154	.98511	341.6	163.4	1.54	.95958	327.7	93.6	1.21
155	.98504	341.5	162.4	1.49	.95899	327.7	95.4	1.18
156	.98617	342.0	162.8	1.38	.96142	328.6	96.8	1.17
157	.98717	340.8	145.7	1.43	.96385	328.4	87.8	1.16
158	.98759	337.2	111.9	1.18	.96265	324.6	61.1	.93
159	.98759	334.0	81.3	.87	.96462	324.8	54.7	.76
160	.98050	332.2	88.5	.89	.96054	323.3	56.0	.77
161	.97744	331.5	92.1	.91	.96039	324.1	62.5	.83
162	.98524	337.7	125.4	1.22	.95669	323.7	68.4	.91
163	.97992	334.0	102.8	1.06	.96120	323.2	52.3	.69
164	.97695	331.1	88.2	.89	.96054	324.0	59.6	.74
165	.97979	331.6	84.0	.84	.95721	323.0	61.1	.73
166	.97482	330.6	93.6	.92	.95634	323.5	70.7	.83
167	.98205	330.5	67.8	.93	.96710	326.0	48.0	.80
168	.97744	330.9	83.8	.82	.95706	323.5	66.0	.76
169	.97440	329.9	83.3	.81	.95649	323.7	68.6	.78
170	.98447	338.4	132.4	1.22	.95191	322.7	73.1	.85
171	.97808	333.6	108.9	1.07	.95220	320.9	57.8	.69
172	.97028	330.0	98.3	.94	.95706	323.5	64.3	.73
173	.97248	329.0	81.1	.82	.95662	323.7	67.0	.77
174	.96957	329.2	96.6	.91	.95316	323.7	76.6	.83
175	.96674	329.0	103.2	.93	.95029	323.1	83.6	.92
176	.98198	334.0	98.5	.94	.97370	327.1	53.1	.86
177	.97595	333.5	112.6	1.01	.96032	324.5	67.6	.97

[a] h measured in J/m^2-sec-°K.

TABLE III.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND FOR PLATE WITH RAMP WITHOUT STRINGERS - Continued

(e) Configuration 5; $P_1 + M_6$

Thermocouple	$M = 2.49$; $T_t = 398^\circ$ K; $p_t = 156\ 712\ N/m^2$				$M = 3.51$; $T_t = 396^\circ$ K; $p_t = 261\ 426\ N/m^2$			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$
1	.97426	322.9	49.8	1.00	.96622	319.8	24.1	.96
2	.97355	322.9	51.7	1.00	.96540	319.6	24.7	.93
3	.97426	323.0	50.0	.99	.96571	319.6	23.7	.92
4	.97355	322.6	48.6	1.00	.96511	319.2	23.3	.93
5	.97283	322.6	50.5	1.00	.96399	319.1	24.3	.92
6	.97263	322.7	52.3	1.01	.96348	319.0	24.5	.94
7	.97191	322.3	50.3	1.00	.96281	318.7	23.9	.92
8	.97156	322.2	50.9	1.00	.96230	318.6	24.3	.94
9	.97111	322.1	51.1	1.00	.96186	318.5	24.7	.93
10	.97091	321.9	51.1	1.00	.96141	318.4	24.7	.94
11	.97084	321.8	50.9	1.00	.96141	318.2	24.3	.94
12	.97019	321.7	51.9	1.00	.96073	318.1	24.9	.95
13	.97055	322.2	53.5	1.01	.96096	318.4	24.9	.91
15	.96982	321.9	52.9	1.00	.96007	318.0	25.3	.93
16	.97033	321.9	52.1	1.00	.96051	318.0	25.3	.95
17	.96997	321.9	52.7	1.00	.96023	318.1	25.3	.93
18	.96960	321.7	51.9	1.00	.96007	317.9	24.9	.94
19	.96938	321.6	52.5	1.00	.95955	317.8	24.9	.92
20	.96922	321.6	52.7	1.01	.95955	317.8	24.9	.93
21	.96916	321.5	52.3	1.01	.95941	317.7	25.9	.96
22	.96916	321.5	52.3	1.00	.95941	318.5	25.7	.96
23	.96922	321.6	51.9	1.00	.95933	317.7	25.5	.94
24	.97127	322.2	52.1	1.01	.96104	318.2	25.1	.95
32	.95659	323.9	119.3	2.25	.93953	314.2	47.4	1.81
33	.94699	320.0	113.4	2.16	.92834	310.1	43.5	1.64
34	.93957	316.7	104.8	2.00	.92500	308.3	39.8	1.50
35	.93681	319.7	93.2	1.76	.92464	308.0	38.2	1.42
36	.93898	315.7	90.3	1.74	.92687	308.7	37.2	1.42
37	.94306	317.0	90.5	1.73	.93028	310.1	38.8	1.45
38	.94692	318.2	89.3	1.71	.93295	311.1	39.6	1.50
39	.95041	319.3	93.4	1.76	.93530	312.0	39.8	1.50
40	.95242	319.6	87.8	1.66	.93590	312.2	40.4	1.51
41	.95511	320.6	87.6	1.63	.93775	313.0	40.9	1.53
42	.95814	321.6	86.4	1.63	.94094	313.9	40.0	1.47
43	.96024	322.1	84.6	1.62	.94294	314.4	39.0	1.41
44	.96143	322.4	84.2	1.58	.94383	314.7	38.8	1.36
45	.96291	322.7	82.5	1.57	.94539	315.1	38.0	1.33
46	.96410	323.1	81.5	1.55	.94688	315.6	37.6	1.31
47	.96536	323.3	80.9	1.57	.94814	315.9	36.8	1.33
48	.96655	323.7	81.1	1.54	.94955	316.4	37.2	1.34
49	.96715	323.9	80.7	1.54	.95058	316.7	37.4	1.37
50	.96796	324.1	79.9	1.52	.95192	317.1	36.4	1.30
51	.96834	324.2	79.7	1.51	.95252	317.2	36.2	1.27
52	.96929	324.5	78.9	1.48	.95428	317.8	36.0	1.24
53	.97098	324.9	77.0	1.50	.95919	320.1	33.9	1.24
54	.97397	323.0	50.7	.98	.96540	319.9	25.3	.94
55	.97276	322.6	50.9	1.00	.96355	319.1	25.3	.92
56	.97241	322.4	50.0	1.00	.96274	319.0	25.5	.92
57	.97270	322.3	48.0	1.00	.96318	319.1	25.7	.93
58	.97355	322.5	47.6	.99	.96348	319.4	27.2	.96
59	.97413	322.9	49.0	.99	.96333	319.5	27.8	.94
60	.97455	322.9	49.2	.98	.96364	319.6	27.6	.94
61	.97111	322.1	51.5	1.00	.96148	318.5	25.7	.93
62	.97084	321.8	49.8	1.01	.96096	318.4	26.4	.96
63	.97140	322.0	49.2	1.00	.96148	318.7	26.6	.93
64	.97241	322.2	49.0	.98	.96141	318.9	28.2	.95
65	.97084	321.9	49.8	1.00	.96073	318.4	25.9	.95
66	.97227	322.2	48.8	.98	.96096	318.8	28.4	.96
67	.97026	321.7	51.1	.99	.96029	318.1	25.7	.95
68	.97026	321.7	50.5	1.00	.95992	318.1	27.0	.96
69	.97084	321.9	49.0	1.00	.96036	318.4	26.6	.95
70	.97098	321.7	48.6	.98	.96007	318.4	28.0	.94
71	.97227	322.3	50.0	.98	.96067	318.7	28.4	.93
72	.97270	322.3	49.6	.98	.96155	319.0	27.6	.92
73	.97084	322.4	54.7	.99	.95882	318.4	28.8	.93
74	.97040	321.6	48.6	.98	.95978	317.9	26.1	.97
75	.97205	322.1	49.2	.98	.96023	318.5	29.4	.99
76	.96967	321.5	50.5	1.00	.95948	317.8	27.0	1.01
77	.97013	321.7	50.9	.99	.95963	318.0	27.0	.94
78	.97140	321.7	48.0	.99	.95963	318.2	27.4	.95
79	.96945	321.4	49.6	1.00	.95888	317.7	26.1	.94
80	.97140	321.8	48.8	1.00	.95963	318.3	27.8	.95
81	.96878	321.2	51.1	1.00	.95807	317.6	26.8	.97
82	.97127	321.8	49.0	.99	.95948	318.2	28.8	.97
83	.97248	322.4	51.1	1.00	.96118	318.4	25.3	.94
84	.96953	321.4	49.8	1.00	.95888	317.7	26.6	.98
85	.96982	321.4	48.8	.99	.95911	317.8	26.8	.96
86	.97013	321.5	48.8	.99	.95860	317.8	27.2	.93
87	.97048	321.6	49.8	.99	.95866	318.0	28.0	.94
88	.97111	321.7	48.8	.98	.95992	318.3	27.2	.94
89	.97111	322.0	51.1	.99	.95919	318.2	29.6	1.01
90	.96982	321.9	53.7	.99	.95725	317.7	30.8	1.02
91	.97341	323.1	54.7	1.06	.96326	319.6	29.8	1.06
92	.97111	321.9	49.4	.96	.95948	318.3	28.0	.92
93	.95957	317.0	39.6	.76	.95065	314.0	20.2	.72
94	.96410	319.5	49.6	.99	.95607	317.0	27.2	.97
95	.96885	321.1	49.0	.98	.96007	318.2	27.6	.96
96	.97212	322.4	51.1	1.03	.96201	319.4	30.0	1.00
97	.97191	320.6	37.2	1.02	.96096	317.5	21.9	.98
98	.97176	322.2	51.1	.97	.95911	318.3	28.8	.93
99	.97026	321.7	51.5	.96	.95776	317.9	28.6	.94

[a] h measured in J/m^2-sec-°K.

TABLE III.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND FOR PLATE WITH RAMP WITHOUT STRINGERS - Continued

(e) Configuration 5; $P_1 + M_6$ - Concluded

Thermocouple	M = 2.49; T_t = 398° K; p_t = 156 712 N/m²				M = 3.51; T_t = 396° K; p_t = 261 426 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$
100	.96834	321.4	53.9	.98	.95518	317.1	29.6	.95
101	.96194	320.2	62.7	1.23	.95362	315.9	26.4	.96
102	.97098	322.1	52.3	1.00	.96126	319.2	29.8	.98
103	.96083	320.4	65.4	1.24	.95585	317.9	29.2	1.04
104	.96699	320.0	44.7	.87	.95814	317.0	24.1	.84
105	.96759	320.6	47.4	.93	.95518	316.1	24.1	.81
106	.96812	320.9	49.4	.94	.95919	318.4	30.0	.97
107	.97048	322.0	52.9	.98	.95763	317.9	29.0	.95
108	.96134	319.7	60.3	1.13	.95569	317.0	28.4	.97
109	.96819	320.8	48.2	.94	.95800	317.9	29.2	.96
110	.96357	320.4	58.2	1.10	.95710	318.1	27.6	.94
111	.96922	320.9	46.6	.92	.96259	318.2	22.7	.78
112	.97026	321.3	46.2	.91	.96067	318.2	26.4	.90
113	.97004	321.4	48.6	.96	.95955	318.1	27.6	.91
114	.96960	321.4	49.4	.95	.95844	317.9	28.2	.92
115	.96871	321.2	50.3	.94	.95822	318.1	29.0	.92
116	.96790	321.1	52.3	.96	.95710	318.0	30.6	.97
117	.97156	322.7	54.3	1.00	.96386	319.0	23.7	.93

[a] h measured in J/m²-sec-°K.

TABLE III.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND FOR PLATE WITH RAMP WITHOUT STRINGERS - Concluded

(f) Configuration 6; $P_1 + M_7$

Thermocouple	M = 2.49; T_t = 397° K; p_t = 154 988 N/m²				M = 3.51; T_t = 397° K; p_t = 257 835 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$
1	.96729	324.1	49.8	1.00	.96398	320.6	23.9	.95
2	.96687	324.1	51.9	1.00	.96307	320.4	24.3	.92
3	.96800	324.3	50.0	.99	.96385	320.5	23.5	.91
4	.96738	323.9	48.6	1.00	.96307	320.1	23.3	.93
5	.96674	323.9	50.5	1.00	.96221	320.0	24.3	.92
6	.96630	324.0	51.7	1.00	.96194	320.0	24.7	.95
7	.96729	324.1	50.3	1.00	.96256	320.1	24.3	.94
49	.94868	332.0	157.1	3.00	.93053	316.3	71.5	2.61
50	.94756	329.7	169.6	3.23	.92368	311.8	59.0	2.11
51	.94970	329.4	160.6	3.03	.91571	308.8	56.0	1.97
52	.94955	329.7	163.4	3.08	.91129	307.6	58.0	2.00
53	.94986	334.4	177.5	3.45	.91350	308.2	55.0	2.01
54	.96723	324.2	51.1	.99	.96327	320.5	24.7	.92
55	.96652	323.9	50.9	1.00	.96179	320.0	25.1	.91
56	.96623	323.6	50.5	1.00	.96091	320.5	26.1	.94
57	.96667	323.6	49.2	1.03	.96126	320.0	25.1	.91
58	.96723	323.8	48.6	1.01	.96164	320.1	25.9	.92
59	.96765	324.3	49.0	.99	.96164	320.4	27.2	.92
60	.96815	324.4	49.6	.99	.96221	320.4	26.6	.91
61	.97516	327.9	60.9	1.18	.96768	323.0	32.7	1.19
62	.97092	325.8	54.5	1.11	.96420	320.7	24.9	.90
63	.96617	323.6	49.6	1.01	.96008	319.6	26.1	.91
64	.96630	323.8	49.8	1.00	.95980	319.7	27.0	.90
65	.97479	327.0	54.7	1.10	.96817	322.7	29.8	1.09
66	.96623	323.7	49.6	.99	.95927	319.7	27.4	.92
68	.97778	330.0	72.3	1.43	.97242	325.6	39.2	1.39
69	.97282	326.2	51.1	1.04	.96591	322.1	29.8	1.07
70	.97162	326.0	53.9	1.09	.96391	320.8	25.7	.86
71	.96893	324.6	50.7	1.00	.95949	319.7	27.8	.91
72	.96709	324.0	50.3	.99	.96032	319.9	27.4	.92
73	.96539	325.5	55.0	.99	.95758	319.2	28.0	.91
74	.97855	331.4	85.0	1.71	.97200	327.0	50.0	1.86
75	.97225	326.4	54.3	1.09	.96256	320.5	27.0	.90
77	.97700	332.2	94.8	1.85	.97094	327.9	56.8	1.97
78	.97205	325.8	51.1	1.05	.96456	322.1	33.1	1.15
79	.98224	332.5	65.0	1.31	.97845	328.4	36.4	1.31
80	.97473	326.7	52.1	1.06	.96548	321.9	29.4	1.01
82	.97742	328.3	59.0	1.19	.97016	323.6	31.5	1.05
85	.96900	329.4	95.2	1.93	.96214	325.2	60.5	2.16
86	.97530	330.3	84.4	1.71	.96761	325.7	51.1	1.75
87	.97579	329.0	70.3	1.40	.97094	324.9	37.8	1.28
88	.97601	327.4	53.9	1.08	.96690	322.5	30.6	1.06
89	.97331	326.4	52.3	1.02	.96398	321.8	32.7	1.12
90	.97205	326.5	57.0	1.04	.96104	319.9	26.6	.88
92	.96765	327.0	77.4	1.51	.96164	323.4	48.8	1.60
95	.95860	322.6	65.4	1.31	.95531	319.6	37.6	1.31
96	.96044	323.1	64.3	1.30	.95507	320.0	40.9	1.36
97	.96108	321.5	48.4	1.32	.95655	319.2	33.3	1.50
98	.96468	325.4	70.1	1.32	.95811	321.6	43.9	1.42
99	.96893	326.1	63.9	1.19	.96349	322.1	35.5	1.17
100	.97176	326.0	55.0	1.00	.96091	320.8	32.3	1.04
102	.96030	322.8	61.1	1.17	.95412	319.6	39.4	1.30
104	.94793	315.6	32.7	.63	.95235	315.4	14.9	.52
105	.94660	315.7	36.8	.72	.94528	313.6	19.2	.64
106	.95617	320.7	52.9	1.00	.95207	318.2	34.3	1.11
107	.96050	322.5	55.8	1.03	.95147	318.5	37.6	1.23
108	.96596	321.2	29.2	.55	.96675	320.2	15.9	.55
109	.95338	318.8	45.8	.89	.94985	316.7	29.6	.97
110	.94072	317.9	78.0	1.48	.93230	310.1	26.1	.90
111	.95124	317.9	42.1	.83	.95478	316.9	20.8	.71
112	.95419	318.0	33.7	.66	.95412	315.9	15.1	.52
113	.95036	316.8	34.5	.68	.94962	315.1	20.4	.67
114	.95220	318.0	40.2	.77	.94955	316.0	26.4	.86
115	.95471	319.4	45.1	.85	.94852	316.3	30.2	.95
116	.95683	320.4	48.6	.89	.94587	315.9	32.7	1.04
117	.96596	324.1	53.7	.99	.96229	320.0	23.9	.94
118	.96490	323.9	55.2	1.10	.96001	319.3	24.3	.94
119	.97205	326.5	58.0	1.18	.96633	322.0	28.4	1.08
120	.97587	328.5	63.9	1.29	.96965	323.1	28.2	1.07
121	.97501	329.3	74.2	1.48	.97045	324.3	34.3	1.27
122	.95654	321.9	63.5	1.22	.94911	317.2	35.7	1.02
123	.94999	318.2	48.8	.95	.94491	314.6	27.6	.96
800	.95228	338.7	207.3		.92552	325.9	164.2	
801	.93985	327.1	167.7		.90621	313.7	116.0	
802	.95978	339.5	245.1		.93385	331.8	210.2	
803	.94616	329.8	178.3		.91026	317.0	131.4	
804	.95360	327.6	118.3		.92869	319.2	67.8	
805	.93777	314.4	62.1		.91726	306.5	34.5	
806	.93329	314.5	73.5		.90362	301.4	34.5	
807	.94308	317.4	63.3		.92227	306.6	25.5	
808	.93814	316.8	79.1		.92339	309.1	41.5	
809	.93146	314.8	78.9		.90872	304.1	39.4	
810	.93985	316.1	60.3		.92427	308.0	28.6	
811	.93543	308.6	7.8		.93790	308.4	2.7	
812	.92372	305.7	17.4		.91822	302.3	5.9	
813	.93587	310.2	19.8		.93215	307.3	7.8	
814	.93653	310.3	18.6		.94911	312.2	2.7	
815	.93661	313.2	40.7		.95914	317.0	11.0	

[a] h measured in J/m²-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS

(a) Configuration 7; P_2

Thermocouple	M = 2.49; T_t = 399° K; p_t = 153 648 N/m²				M = 3.51; T_t = 398° K; p_t = 257 309 N/m²				M = 4.44; T_t = 379° K; p_t = 416 032 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$
1	.96525	323.5	45.4	.91	.95442	318.7	23.9	.95	.92801	314.5	15.7	1.31
2	.96808	324.8	47.6	.92	.95692	319.3	22.5	.85	.92950	314.7	12.7	1.02
3	.97069	325.6	47.4	.94	.96128	320.7	21.9	.85	.93432	316.1	11.4	.97
4	.97075	325.4	45.1	.92	.96284	321.2	21.7	.86	.93696	317.0	11.4	.95
5	.97082	325.5	46.6	.92	.96290	321.3	21.9	.83	.93772	317.4	12.1	.94
6	.97048	325.6	47.6	.92	.96284	321.3	23.1	.88	.93828	317.5	11.4	.90
7	.97033	325.4	46.4	.92	.96290	321.2	22.1	.85	.93869	317.7	11.4	.93
8	.97020	325.3	46.8	.92	.96284	321.2	22.7	.87	.93897	317.7	11.4	.90
9	.96998	325.2	47.2	.92	.96255	321.2	22.9	.86	.93904	317.7	11.2	.90
10	.96969	325.1	46.2	.90	.96220	321.0	22.1	.84	.93897	317.7	10.4	.88
11	.96991	325.1	45.4	.89	.96255	321.0	22.3	.86	.93910	317.6	8.8	.77
12	.96914	325.0	46.4	.89	.96178	320.9	22.5	.86	.93862	317.6	11.2	.93
13	.96921	325.3	48.0	.90	.96198	321.2	23.3	.85	.93884	317.7	11.6	.92
15	.96857	325.0	47.6	.90	.96156	320.9	22.1	.81	.93856	317.5	11.4	.90
16	.96927	325.1	47.0	.90	.96255	321.1	21.9	.82	.93925	317.7	11.0	.92
17	.96892	325.1	47.4	.90	.96227	321.0	22.3	.81	.93897	317.7	11.0	.89
18	.96857	324.8	46.8	.90	.96171	320.8	21.4	.81	.93835	317.4	10.6	.84
19	.96808	324.7	46.8	.89	.96143	320.7	21.7	.80	.93815	317.4	10.6	.88
20	.96808	324.6	46.6	.89	.96163	320.7	21.0	.79	.93835	317.4	10.4	.91
21	.96779	324.6	46.4	.89	.96156	320.7	21.0	.78	.93841	317.5	9.6	.85
22	.96758	324.6	46.4	.89	.96149	320.6	21.0	.79	.93821	317.4	9.8	.84
23	.96709	324.3	46.0	.89	.96114	320.5	21.0	.77	.93772	317.2	11.2	.93
24	.96702	324.2	46.6	.90	.96134	320.5	20.4	.77	.93787	317.3	11.4	.95
25	.96751	324.4	45.8	.88	.96242	320.8	20.0	.75	.93841	317.4	11.4	.97
26	.96793	324.5	45.6	.87	.96290	320.9	21.0	.80	.93904	317.6	10.4	.91
27	.96808	324.4	44.1	.88	.96284	320.9	19.6	.76	.93876	317.5	9.8	.91
28	.96779	324.4	44.7	.89	.96284	321.0	19.6	.74	.93862	317.5	9.4	.87
29	.96667	324.1	46.6	.86	.96242	320.9	20.0	.74	.93703	317.1	10.2	.75
30	.96687	324.2	46.8	.88	.96248	320.8	20.0	.75	.93711	317.0	10.6	.85
31	.96667	324.1	46.0	.86	.96242	320.7	20.2	.75	.93724	317.0	10.6	.84
33	.96625	323.9	46.0	.88	.96255	320.7	19.4	.73	.93759	317.1	10.0	.88
34	.96715	324.1	45.6	.87	.96339	321.1	19.8	.75	.93897	317.4	9.4	.72
35	.96766	324.2	45.4	.86	.96424	321.3	19.6	.73	.93953	317.6	8.8	.68
36	.96687	324.0	44.5	.86	.96339	321.0	18.8	.72	.93890	317.4	8.8	.69
37	.96680	323.9	44.9	.86	.96325	321.0	19.4	.73	.93884	317.4	8.2	.65
38	.96652	323.9	45.6	.87	.96304	320.9	19.0	.72	.93869	317.4	7.8	.59
39	.96667	324.0	46.0	.87	.96312	320.9	19.0	.72	.93869	317.4	8.2	.61
40	.96510	323.5	45.4	.86	.96191	320.5	18.8	.70	.93731	316.9	9.6	.77
41	.96546	323.7	47.0	.87	.96233	320.6	19.8	.74	.93731	317.0	9.8	.81
42	.96610	323.9	46.4	.88	.96297	320.9	19.4	.71	.93841	317.3	8.8	.67
43	.96638	323.9	45.8	.88	.96325	320.9	19.4	.70	.93869	317.4	8.6	.63
44	.96603	323.7	45.8	.86	.96297	320.8	19.4	.68	.93835	317.2	8.6	.63
45	.96625	323.7	44.9	.85	.96354	320.9	19.2	.67	.93890	317.4	7.6	.61
46	.96645	323.8	45.1	.86	.96382	321.0	18.4	.64	.93925	317.4	7.6	.56
47	.96709	323.9	44.5	.86	.96466	321.3	18.0	.65	.93979	317.6	7.8	.57
48	.96687	324.1	45.8	.87	.96444	321.3	18.2	.65	.93979	317.6	7.6	.52
49	.96638	323.9	46.0	.88	.96361	321.0	18.8	.69	.93897	317.4	9.0	.64
50	.96342	323.0	46.2	.88	.96022	320.0	20.0	.72	.93669	316.7	9.8	.71
51	.96214	321.4	40.2	.76	.95621	318.2	16.8	.59	.93438	315.9	8.0	.58
52	.96510	323.6	48.2	.91	.95615	319.0	21.7	.75	.93295	315.5	8.2	.61
53	.96369	322.7	42.3	.82	.95464	318.4	19.4	.71	.93101	315.1	10.4	.85
54	.96737	324.6	47.0	.91	.95564	319.1	23.9	.89	.92843	314.5	13.7	1.06
55	.97097	325.7	47.8	.94	.96248	321.4	23.9	.87	.93787	317.5	13.1	1.03
56	.97020	325.4	46.8	.93	.96114	321.0	24.7	.89	.93703	317.3	13.5	1.05
57	.97048	325.3	45.1	.94	.96149	321.1	23.9	.87	.93703	317.3	13.9	1.01
58	.97091	325.4	44.9	.94	.96143	321.2	25.3	.90	.93632	317.2	14.5	.96
59	.97126	325.8	45.6	.92	.96143	321.4	25.7	.87	.93504	316.9	15.9	.96
60	.97168	325.9	46.6	.93	.96255	321.6	25.1	.86	.93231	316.0	17.8	1.04
61	.96978	325.3	47.4	.92	.96233	321.3	23.5	.85	.93966	318.1	11.8	.88
62	.96907	324.9	46.2	.94	.96156	321.0	23.9	.87	.93925	317.9	12.7	.97
63	.96991	325.1	45.4	.92	.96227	321.4	24.7	.86	.93959	318.1	13.5	.99
64	.97062	325.2	45.6	.91	.96227	321.5	26.4	.88	.93759	317.7	15.3	.97
65	.96927	325.0	46.2	.93	.96178	321.2	23.9	.87	.93979	318.1	12.7	1.00
66	.97020	325.2	45.4	.91	.96227	321.6	25.1	.85	.93800	317.8	15.1	.99
67	.96899	325.0	46.6	.90	.96233	321.2	22.3	.83	.93979	318.0	10.6	.84
68	.96879	324.9	46.0	.91	.96156	321.1	23.5	.83	.93953	318.0	12.3	.92
69	.96907	324.9	44.7	.91	.96149	321.1	25.1	.90	.93897	317.9	13.3	.98
70	.96907	324.8	44.9	.91	.96101	321.0	25.3	.85	.93800	317.6	13.3	.94
71	.97033	325.2	44.7	.88	.96242	322.9	25.3	.83	.93821	317.8	14.7	.91
72	.97091	325.4	44.3	.88	.96297	321.7	24.5	.82	.93718	317.5	15.7	.97
73	.96978	325.6	48.4	.87	.96185	321.5	25.7	.83	.93447	316.7	18.2	1.00
74	.96879	324.6	45.1	.91	.96149	320.9	24.7	.92	.93925	317.8	12.9	.94
75	.96998	325.2	45.1	.90	.96233	321.4	24.9	.84	.93807	317.7	15.5	.93
76	.96870	324.8	46.0	.91	.96255	321.0	21.4	.80	.93938	317.8	11.4	.89
77	.96899	324.9	46.4	.90	.96213	321.1	22.7	.79	.93953	318.0	12.5	.90
78	.96934	324.7	43.3	.89	.96185	321.1	23.7	.82	.93746	317.5	14.3	.93
79	.96808	324.4	43.9	.89	.96149	320.8	22.1	.79	.93904	317.7	11.8	.91
80	.96934	324.7	43.3	.88	.96198	321.2	23.7	.81	.93759	317.5	14.1	.87
81	.96687	324.1	44.7	.88	.96037	320.4	21.9	.79	.93800	317.4	11.2	.83
82	.96907	324.7	43.1	.87	.96213	321.1	23.5	.79	.93759	317.5	13.7	.88
83	.96729	324.3	45.8	.90	.96134	320.6	20.8	.77	.93787	317.3	10.6	.85
84	.96744	324.2	44.5	.89	.96086	320.5	21.9	.80	.93815	317.5	11.6	.90
85	.96744	324.0	43.3	.88	.96051	320.4	21.7	.77	.93746	317.3	11.6	.83
86	.96786	324.2	43.3	.88	.96072	320.6	22.1	.76	.93690	317.2	12.9	.93
87	.96837	324.4	43.3	.86	.96143	321.0	23.3	.79	.93683	317.2	13.9	.88
88	.96921	324.7	42.9	.86	.96242	321.2	22.7	.78	.93590	317.0	14.7	.89
89	.96963	325.0	44.7	.87	.96284	321.4	23.1	.79	.93453	316.6	15.7	.90
90	.96921	325.1	46.8	.86	.96198	321.2	23.7	.78	.93332	316.2	17.8	1.01
91	.96702	324.1	45.4	.88	.96121	320.6	21.4	.76	.93780	317.4	13.9	.97
92	.96863	324.5	43.9	.86	.96268	321.2	23.1	.76	.93746	317.4	14.9	.91
93	.96652	324.0	45.4	.87	.96143	320.6	20.2	.72	.93696	316.9	10.2	.82

[a] h measured in $J/m^2\text{-sec-}^{\circ}K$.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(a) Configuration 7; p_2 - Concluded

Thermocouple	M = 2.49; T_t = 399° K; p_t = 153 648 N/m²				M = 3.51; T_t = 398° K; p_t = 257 309 N/m²				M = 4.44; T_t = 379° K; p_t = 416 032 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(1)}}$
94	.96667	323.8	43.5	.87	.96128	320.6	21.0	.75	.93759	317.2	10.8	.87
95	.96680	323.9	43.9	.88	.96121	320.6	20.8	.73	.93759	317.2	11.8	.77
96	.96695	323.9	42.9	.86	.96101	320.6	22.1	.73	.93683	317.0	13.7	.86
97	.96561	321.9	31.1	.85	.96114	319.7	15.5	.70	.93626	316.6	9.8	.84
98	.96821	324.5	44.1	.83	.96255	321.2	23.1	.75	.93489	316.6	14.3	.80
99	.96863	324.6	44.7	.84	.96262	321.2	23.1	.76	.93332	316.1	15.7	.92
100	.96786	324.5	46.0	.83	.96128	320.9	22.9	.74	.93152	315.6	16.1	.89
101	.96574	323.5	44.5	.88	.96121	320.3	19.6	.72	.93738	317.0	10.4	.81
102	.96751	324.2	43.7	.84	.96255	321.1	21.9	.72	.93677	317.1	12.3	.73
103	.96546	323.9	46.0	.87	.96092	320.4	20.0	.71	.93683	316.9	9.8	.73
104	.96539	323.5	44.3	.86	.96079	320.2	20.0	.70	.93703	316.9	10.0	.72
105	.96574	323.6	44.5	.87	.96163	320.6	20.4	.68	.93787	317.2	11.0	.73
106	.96729	324.1	44.3	.84	.96255	321.0	21.9	.71	.93677	317.1	13.1	.79
107	.96758	324.2	44.3	.82	.96262	321.0	21.4	.70	.93295	315.9	16.1	.89
108	.96546	323.6	45.6	.86	.96213	321.1	19.4	.66	.93815	317.2	10.4	.78
109	.96715	323.9	42.7	.83	.96268	321.0	21.2	.70	.93696	317.1	12.7	.76
110	.96144	321.2	38.6	.73	.95479	318.0	17.4	.59	.93346	315.7	9.6	.60
111	.96214	321.3	37.8	.75	.95492	317.9	16.5	.57	.93410	315.9	10.0	.66
112	.96201	321.1	37.6	.74	.95405	317.7	17.8	.61	.93304	315.6	11.0	.69
113	.96278	321.4	37.6	.74	.95412	317.8	18.8	.62	.93289	315.7	12.1	.79
114	.96327	321.6	37.2	.71	.95464	318.1	20.0	.65	.93174	315.4	13.7	.83
115	.96314	321.6	37.6	.70	.95427	318.1	20.0	.63	.92950	314.8	13.3	.76
116	.96278	321.5	38.0	.70	.95353	317.9	20.0	.64	.92771	314.2	14.1	.75
117	.97020	325.7	49.6	.92	.96268	321.1	21.9	.86	.93746	317.1	8.4	.68
118	.96907	325.6	50.0	1.00	.96374	321.4	22.1	.86	.93959	317.7	8.8	.80
119	.96879	325.2	50.0	1.02	.96325	321.2	22.3	.84	.93953	317.8	9.0	.79
120	.96793	325.1	50.3	1.01	.96275	320.9	21.4	.81	.93835	317.3	8.0	.78
121	.96793	325.1	50.0	1.00	.96304	321.0	21.2	.79	.93856	317.2	7.1	.71
122	.96625	324.2	48.4	.93	.96319	320.9	19.6	.56	.93821	317.1	8.2	.57
123	.96554	324.0	48.2	.94	.96325	320.8	19.8	.69	.93828	317.1	8.2	.62
130	.96892	327.1	44.5		.95916	321.6	23.7		.93496	317.1	13.7	
131	.96342	333.0	55.4		.95420	321.2	32.3		.93123	316.3	17.6	
132	.96433	332.5	51.9		.95340	321.0	32.7		.93023	316.2	19.2	
133	.96581	325.1	40.4		.95868	320.2	18.0		.93368	316.1	10.0	
134	.96221	325.1	46.8		.95157	319.7	27.6		.92850	315.3	17.0	
135	.96497	324.7	38.0		.95791	320.0	18.0		.93368	316.1	9.4	
136	.96596	328.7	61.5		.95720	321.9	29.0		.93253	316.7	15.9	
137	.96808	326.2	40.4		.96002	320.8	17.8		.93504	316.6	9.2	
138	.96475	326.4	48.8		.95310	319.8	24.7		.93023	315.5	13.1	

[a] h measured in J/m²-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(b) Configuration 8; $P_2 + M_1$

Thermocouple	M = 2.49; T_t = 402° K; p_t = 155 946 N/m²				M = 3.51; T_t = 398° K; p_t = 257 117 N/m²				M = 4.44; T_t = 378° K; p_t = 417 420 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.96651	325.1	46.0	1.01	.95274	316.2	25.5	1.07	.93812	313.8	13.9	.88
2	.96961	326.5	48.0	1.01	.95495	316.7	24.3	1.08	.93972	314.1	12.3	.97
3	.97304	327.6	47.4	1.00	.95928	318.2	23.3	1.07	.94497	315.5	12.5	1.09
4	.97566	328.4	47.0	1.04	.96366	319.6	23.5	1.08	.95021	317.2	10.8	.95
50	.95666	323.6	61.1	1.32	.95169	317.1	39.2	1.96	.93944	314.2	16.5	1.69
51	.95679	323.1	57.8	1.44	.95156	316.5	33.7	2.01	.93507	312.5	14.7	1.85
52	.95714	323.6	61.1	1.27	.95081	317.3	41.5	1.92	.93317	312.2	17.0	2.08
53	.95453	322.5	56.4	1.33	.94979	316.8	39.6	2.04	.93332	312.4	17.0	1.63
54	.96862	326.2	47.2	1.00	.95377	317.2	25.7	1.08	.93885	313.9	12.9	.94
55	.97313	327.7	47.6	1.00	.96140	319.0	25.3	1.06	.94954	317.2	12.1	.92
56	.97128	327.0	46.4	.99	.95936	318.4	25.7	1.04	.94766	316.7	12.7	.94
57	.97164	326.9	44.1	.98	.95995	318.5	24.7	1.03	.94751	316.7	12.9	.93
58	.97143	326.8	44.7	1.00	.96009	318.7	26.1	1.03	.94701	316.7	14.5	1.00
59	.97269	327.5	45.6	1.00	.96039	319.0	27.2	1.06	.94576	316.5	15.7	.99
60	.97355	327.6	46.0	.99	.96169	319.4	27.2	1.08	.94322	315.6	16.3	.92
61	.97524	329.1	54.3	1.15	.96338	320.2	31.5	1.34	.95027	318.0	15.9	1.34
62	.97298	327.8	49.6	1.08	.96196	319.4	26.8	1.12	.95161	318.0	12.1	.95
63	.97192	327.1	45.6	1.00	.96090	318.9	25.7	1.04	.95077	317.7	12.1	.89
64	.97205	327.1	44.9	.99	.96083	319.0	26.6	1.01	.94861	317.2	14.5	.95
65	.97333	328.1	50.7	1.10	.96140	319.4	28.2	1.18	.95112	318.1	14.1	1.11
66	.97185	327.0	44.1	.97	.96083	319.1	27.0	1.07	.94919	317.4	14.9	.99
67	.98016	334.7	59.6	1.28	.97053	325.1	35.1	1.58	.95546	320.0	18.2	1.71
68	.97396	328.9	55.4	1.20	.96147	319.7	31.5	1.34	.95027	317.9	15.7	1.28
69	.97256	327.6	48.0	1.07	.96125	319.2	26.4	1.05	.95112	317.9	13.1	.98
70	.97128	326.8	45.4	1.01	.96002	318.7	26.1	1.03	.94947	317.4	13.7	1.03
71	.97234	327.1	44.5	1.00	.96112	319.1	26.8	1.06	.94947	317.4	14.5	.99
72	.97284	327.1	43.9	.99	.96196	319.3	25.9	1.06	.94861	317.2	15.1	.96
73	.97172	327.4	47.8	.99	.96134	319.3	27.2	1.06	.94576	316.4	16.1	.89
74	.97361	329.0	57.8	1.28	.96046	319.9	34.9	1.41	.94846	317.7	17.6	1.37
75	.97269	327.2	45.8	1.01	.96105	319.0	26.6	1.07	.94954	317.4	13.5	.87
77	.97474	329.9	60.7	1.31	.96183	321.7	38.8	1.71	.94861	318.9	20.0	1.61
78	.97249	327.1	44.3	1.02	.96053	318.7	24.9	1.05	.94904	317.2	13.3	.93
79	.97432	329.6	60.9	1.39	.96231	320.7	37.2	1.69	.94824	317.8	18.6	1.57
80	.97269	327.4	47.0	1.08	.96112	318.9	25.5	1.08	.94934	317.3	13.5	.96
81	.97045	328.2	60.1	1.34	.96061	320.1	36.2	1.65	.94686	317.4	20.0	1.78
82	.97269	327.7	49.6	1.15	.96125	319.1	26.4	1.12	.94947	317.4	13.3	.97
84	.96735	326.0	50.3	1.13	.95744	318.1	28.8	1.32	.94380	315.7	15.3	1.32
85	.97016	327.9	58.2	1.34	.95774	319.2	36.2	1.67	.94335	316.3	21.2	1.82
86	.97227	328.4	55.8	1.29	.95803	319.0	34.7	1.57	.94474	316.4	17.8	1.38
87	.97192	327.9	51.7	1.19	.95995	318.9	28.0	1.20	.94867	317.2	14.3	1.03
88	.97298	327.5	47.0	1.10	.96169	319.0	24.7	1.09	.94794	316.7	14.3	.97
89	.97319	327.5	47.0	1.05	.96169	319.1	24.7	1.07	.94627	316.2	14.3	.91
90	.97214	327.2	48.0	1.03	.96112	319.0	25.3	1.07	.94510	315.9	15.3	.86
91	.96024	323.3	48.8	1.08	.95436	316.9	28.6	1.33	.94095	314.4	12.9	.93
92	.97256	328.3	56.8	1.29	.95936	320.5	36.0	1.56	.94497	316.6	18.6	1.25
94	.96398	324.8	48.8	1.12	.95479	317.0	26.4	1.25	.93987	314.1	13.7	1.26
95	.96390	324.7	48.2	1.10	.95495	317.1	28.0	1.34	.94335	315.3	13.3	1.12
96	.96636	325.3	46.2	1.08	.95825	318.2	28.2	1.28	.94541	316.2	15.5	1.13
98	.97185	327.8	54.7	1.24	.96024	319.6	33.5	1.45	.94365	316.0	18.6	1.30
99	.97249	328.1	55.6	1.24	.96053	319.2	28.4	1.23	.94504	316.0	15.9	1.01
100	.97115	327.5	51.3	1.12	.96068	318.8	24.9	1.09	.94365	315.5	15.3	.95
101	.95756	318.0	8.4	.19	.95972	316.0	4.1	.21	.94831	315.5	2.2	.22
102	.96750	325.6	46.2	1.06	.96046	319.1	28.8	1.32	.94772	317.1	16.3	1.33
103	.94736	317.2	30.0	.65	.94014	310.5	13.9	.69	.93273	310.6	5.7	.58
104	.95807	321.9	41.7	.94	.94935	314.4	20.6	1.03	.93812	313.0	10.2	1.02
105	.96369	324.1	44.7	1.00	.95567	317.5	24.9	1.22	.94474	315.4	12.3	1.11
106	.96664	325.4	47.4	1.07	.95943	318.5	27.6	1.26	.94817	317.0	15.5	1.19
107	.97016	326.5	46.6	1.05	.96231	319.9	29.8	1.39	.94387	316.0	18.2	1.13
108	.95862	324.4	62.1	1.36	.94169	311.7	19.8	1.02	.93578	311.7	5.9	.57
109	.96622	325.0	44.5	1.04	.95921	318.2	26.1	1.23	.94802	316.9	14.1	1.11
110	.96875	328.1	64.3	1.67	.94891	316.2	37.4	2.15	.92479	309.5	17.4	1.81
111	.95483	322.0	55.2	1.46	.93483	309.5	21.9	1.32	.93193	310.8	8.8	.88
112	.95468	320.5	42.9	1.14	.94861	314.0	19.6	1.10	.93987	313.6	9.8	.89
113	.95996	321.9	38.6	1.03	.94764	313.9	21.2	1.13	.94015	314.0	11.8	.98
114	.95750	321.0	38.0	1.02	.94773	314.4	24.3	1.21	.94009	314.2	13.5	.99
115	.95877	321.7	39.6	1.05	.94957	315.0	25.7	1.29	.93935	314.1	15.7	1.18
116	.96003	322.1	39.6	1.04	.95215	316.0	25.5	1.28	.93827	314.1	17.6	1.25
117	.97143	327.4	49.8	1.00	.96068	318.6	24.1	1.10	.94787	316.3	11.2	1.34
118	.97093	327.3	49.2	.98	.96154	319.5	24.1	1.09	.95042	317.0	9.4	1.07
119	.97214	327.9	53.3	1.07	.96260	320.1	26.6	1.19	.95218	317.7	10.2	1.14
120	.97227	328.4	55.8	1.11	.96260	319.2	24.5	1.14	.95132	317.2	9.8	1.23
121	.97269	328.7	57.8	1.16	.96302	319.5	25.3	1.19	.95168	317.4	10.0	1.40
122	.96475	325.6	55.2	1.14	.95715	318.6	28.8	1.47	.94532	315.5	11.8	1.45
123	.96482	324.1	41.5	.86	.95995	317.9	21.2	1.07	.95161	317.3	9.8	1.20
130	.97221	334.5	51.3	1.15	.95972	320.0	26.6	1.12	.94744	317.4	13.9	1.01
131	.96693	328.6	50.5	.91	.95318	319.4	29.4	.91	.94015	315.2	15.1	.86
132	.95785	326.9	61.3	1.18	.93771	314.0	35.3	1.08	.92473	310.7	20.2	1.05
133	.96862	323.2	15.1	.37	.96324	318.1	9.0	.50	.94904	316.1	3.9	.39
134	.96609	326.9	40.4	.86	.95296	317.5	25.1	.91	.94227	315.8	14.7	.87
135	.94942	317.7	19.8	.52	.93844	310.1	10.6	.59	.93302	310.8	5.3	.57
136	.98551	335.0	33.3	.54	.97068	322.0	16.5	.57	.95253	317.9	6.9	.44
200	.96130	334.7	127.3		.94213	319.5	74.6		.92043	312.6	41.1	
201	.96369	329.0	90.5		.94773	316.8	48.4		.92661	312.6	28.0	
202	.94977	329.0	145.7		.92636	314.0	94.4		.90542	308.5	57.0	
203	.94377	327.5	150.4		.91650	316.0	104.4		.89385	306.6	67.2	
204	.94942	325.9	100.5		.92608	311.1	58.8		.90527	305.1	30.8	
205	.96792	328.0	69.0		.94904	316.1	37.2		.92793	311.9	21.0	
206	.93910	319.5	76.6		.91296	304.2	36.4		.89181	299.8	20.8	
207	.94795	321.2	70.9		.92608	307.6	31.7		.90608	302.9	15.5	
208	.96932	326.0	44.9		.95060	314.6	19.8		.92981	310.2	9.6	
209	.93815	319.4	86.4		.91768	306.3	45.8		.90397	304.1	24.7	

[a] h measured in J/m²-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(b) Configuration 8; $P_2 + M_1$ - Concluded

Thermo-couple	M = 2.49; T_t = 402° K; p_t = 155 946 N/m²				M = 3.51; T_t = 398° K; p_t = 257 117 N/m³				M = 4.44; T_t = 378° K; p_t = 417 420 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
210	.94743	321.6	69.9		.92857	309.4	37.0		.91424	307.1	20.4	
211	.96763	325.2	42.1		.95140	314.9	20.2		.93390	311.5	10.4	
212	.94012	320.2	79.9		.92114	307.5	42.1		.90754	305.2	21.7	
213	.94825	321.2	67.4		.93034	309.5	34.3		.91591	306.4	17.6	
214	.95483	320.5	37.6		.94447	312.5	16.3		.92895	309.8	7.1	
215	.93836	314.0	37.2		.92459	305.2	14.7		.91437	304.4	7.1	
216	.94962	318.4	35.3		.93579	309.2	14.7		.92298	307.4	6.7	
217	.96207	322.4	31.3		.95053	314.0	12.7		.93483	311.3	5.1	
218	.95771	321.5	43.1		.94911	313.9	18.8		.94037	313.0	4.9	
219	.95905	323.6	50.3		.95302	315.1	16.1		.94292	313.8	4.9	
220	.95580	322.0	48.2		.94331	312.4	20.6		.93812	312.7	9.0	

[a] h measured in J/m²-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(c) Configuration 9; $P_2 + M_2$ reversed

Thermocouple	M = 2.49; T_t = 398° K; p_t = 155 180 N/m^2				M = 3.51; T_t = 394° K; p_t = 258 410 N/m^2				M = 4.44; T_t = 379° K; p_t = 417 899 N/m^2			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.96232	321.3	45.8	1.01	.95846	315.0	25.1	1.05	.94427	315.5	14.3	.91
2	.96531	322.6	48.0	1.01	.96010	315.4	23.9	1.06	.94572	315.6	12.7	1.00
3	.96793	323.5	47.6	1.00	.96397	316.6	23.1	1.06	.95009	316.9	10.0	.88
4	.96786	323.2	45.4	1.00	.96516	317.0	22.9	1.06	.95253	317.6	9.2	.80
5	.96772	323.3	46.8	1.00	.96516	317.0	23.3	1.07	.95358	318.1	10.8	.90
6	.96772	323.5	48.2	1.01	.96501	317.1	23.9	1.04	.95422	318.4	10.8	.95
7	.96730	323.1	46.6	1.00	.96485	317.0	23.5	1.06	.95479	318.4	10.4	.91
8	.96715	323.0	47.2	1.01	.96501	317.0	23.1	1.02	.95534	318.6	11.0	.96
9	.96914	323.7	46.6	.99	.96693	317.6	23.7	1.04	.95779	319.4	10.6	.95
10	.97495	329.1	62.9	1.36	.97428	321.4	34.7	1.57	.96369	322.1	15.9	1.53
11	.98475	327.6	42.1	.93	.98066	320.6	15.9	.72	.96530	321.3	8.4	.95
12	.98978	327.2	21.0	.45	.98682	321.5	5.9	.26	.96951	322.0	2.0	.18
44	.95266	316.1	28.2	.62	.95413	311.5	10.0	.52	.95275	316.4	2.9	.33
45	.95436	317.7	36.8	.82	.95116	311.4	18.2	.95	.94732	315.2	8.6	1.14
46	.94935	318.2	57.6	1.28	.94475	310.9	28.8	1.57	.93989	313.6	13.5	1.78
47	.94315	317.1	64.6	1.45	.93820	308.9	29.6	1.65	.93435	311.7	14.9	1.92
48	.94330	317.7	68.4	1.50	.93672	308.4	31.5	1.73	.93238	311.1	13.9	1.84
49	.94580	318.6	69.7	1.52	.93723	308.5	29.0	1.54	.93231	311.0	12.5	1.39
50	.94609	318.7	69.3	1.50	.93626	308.1	29.2	1.46	.93136	310.7	13.1	1.33
51	.94609	317.2	61.1	1.52	.93522	307.0	23.9	1.43	.93041	310.1	10.6	1.33
52	.94963	320.0	70.7	1.47	.93604	308.5	32.5	1.50	.93041	310.5	13.5	1.65
53	.94935	318.9	60.9	1.44	.93864	308.7	26.8	1.38	.93201	311.2	13.3	1.27
54	.96446	322.4	47.4	1.01	.95890	315.1	24.7	1.03	.94470	315.5	13.5	.99
55	.96737	323.3	48.0	1.00	.96441	317.0	24.9	1.04	.95387	318.4	12.3	.94
56	.96688	323.0	46.8	1.00	.96337	316.7	27.8	1.12	.95345	318.2	12.7	.94
57	.96723	322.9	45.1	1.00	.96397	316.7	24.9	1.04	.95323	318.2	13.5	.97
58	.96701	322.9	45.4	1.01	.96412	316.9	25.7	1.02	.95247	318.1	14.1	.97
59	.96821	323.6	46.4	1.02	.96456	317.2	26.6	1.03	.95126	317.8	14.5	.91
60	.96814	323.5	46.8	1.00	.96501	317.4	26.8	1.07	.94836	317.0	14.7	.83
61	.97014	324.2	48.2	1.02	.96709	318.5	24.7	1.05	.95843	319.7	11.2	.95
62	.96617	322.7	46.0	1.00	.96352	316.6	25.5	1.07	.95577	319.0	12.7	1.00
63	.96637	322.7	46.0	1.01	.96412	317.0	25.9	1.05	.95590	319.1	12.3	.91
64	.96701	324.2	46.6	1.02	.96412	317.1	27.2	1.03	.95393	318.6	14.3	.93
65	.97070	324.9	50.7	1.10	.96702	317.7	24.5	1.03	.95878	319.9	11.8	.94
66	.96688	322.9	46.0	1.01	.96412	317.1	27.2	1.08	.95437	318.7	14.1	.93
67	.97850	332.7	81.1	1.74	.97486	327.1	46.8	2.10	.96011	322.4	26.1	2.46
68	.96943	325.6	61.9	1.35	.96262	317.7	36.2	1.54	.95689	320.1	17.6	1.43
69	.96963	324.2	48.4	1.08	.96516	317.2	24.7	.98	.95674	319.3	12.3	.92
70	.96630	322.6	44.9	1.00	.96306	316.6	25.9	1.02	.95450	318.7	13.1	.98
71	.96708	323.0	46.0	1.03	.96381	317.1	26.8	1.06	.95457	318.7	14.3	.97
72	.96750	323.1	45.1	1.02	.96485	317.2	25.7	1.05	.95358	318.5	14.3	.91
73	.96644	323.3	51.7	1.07	.96359	317.1	27.4	1.06	.95090	317.7	15.1	.83
74	.97127	331.5	76.0	1.68	.96366	322.2	48.8	1.98	.95055	319.2	26.4	2.05
75	.96737	323.0	45.1	1.00	.96366	316.9	26.6	1.07	.95429	318.7	13.1	.84
76	.99100	326.0	5.9	.13	.99176	322.9	2.0	.10	.96853	321.9	.8	.07
77	.96524	329.1	73.1	1.58	.95965	318.4	48.0	2.12	.94652	317.9	27.0	2.16
78	.96928	323.7	46.2	1.07	.96352	316.6	25.3	1.07	.95408	318.5	13.7	.96
79	.95436	320.0	56.6	1.29	.95033	313.4	34.1	1.55	.93968	314.4	20.6	1.74
80	.96830	324.2	53.3	1.23	.96538	317.2	26.6	1.12	.95492	318.7	13.3	.94
81	.95185	319.4	62.1	1.39	.94528	311.4	31.3	1.43	.93407	312.0	15.5	1.38
82	.96673	324.3	61.3	1.42	.96247	317.1	31.5	1.34	.95464	318.9	14.3	1.04
84	.95147	319.2	57.8	1.30	.94415	311.1	32.3	1.48	.93188	311.4	15.3	1.32
85	.95516	320.1	54.7	1.26	.95048	313.2	32.3	1.49	.93887	313.9	17.2	1.47
86	.96203	322.7	57.6	1.33	.95532	315.6	39.0	1.77	.94180	315.6	22.5	1.75
87	.96630	324.4	64.1	1.48	.95831	317.2	37.2	1.60	.94966	317.7	18.2	1.31
88	.96652	323.8	56.8	1.32	.96463	317.1	25.9	1.14	.95297	318.1	12.9	.88
89	.96843	323.9	48.6	1.09	.96381	316.7	24.9	1.08	.95098	317.5	12.5	.79
90	.96673	323.1	46.8	1.00	.96306	316.6	25.7	1.09	.94996	317.2	13.3	.75
91	.95331	319.5	53.7	1.18	.94869	312.6	31.5	1.47	.93741	313.3	16.1	1.16
92	.96475	323.2	53.5	1.22	.96158	317.4	35.5	1.54	.94821	317.4	19.8	1.33
94	.95228	318.0	45.8	1.05	.94981	312.1	25.5	1.21	.94076	314.1	15.1	1.40
95	.95767	320.6	52.1	1.19	.95331	313.6	28.8	1.38	.94522	315.4	12.9	1.09
96	.96004	321.1	49.6	1.16	.95756	315.1	28.8	1.31	.94923	316.8	13.1	.96
97	.96032	319.4	35.1	1.13	.96158	315.6	23.1	1.49	.95018	317.1	12.3	1.25
98	.96495	323.1	55.4	1.25	.96381	317.9	34.1	1.48	.94864	317.5	18.6	1.30
99	.96759	325.7	56.0	1.25	.96218	318.0	33.1	1.43	.94806	316.9	16.5	1.05
100	.96573	323.7	58.0	1.26	.96202	316.4	27.6	1.21	.94886	316.9	14.9	.92
101	.93680	311.5	33.5	.75	.94408	308.7	14.1	.72	.93771	312.1	5.7	.55
102	.96063	322.5	49.6	1.14	.96069	316.1	28.8	1.32	.95198	318.0	15.1	1.23
103	.93813	314.2	52.1	1.13	.94028	307.9	17.0	.85	.93712	311.9	5.9	.60
104	.95103	317.6	45.1	1.02	.95056	311.7	20.0	1.00	.94485	315.0	9.6	.96
105	.95664	319.2	43.7	.98	.95466	313.5	23.5	1.15	.94594	315.5	11.4	1.04
106	.96070	321.0	47.0	1.06	.96010	315.8	28.0	1.28	.95211	317.9	13.5	1.03
107	.96282	321.7	46.8	1.06	.96397	319.0	29.2	1.36	.94959	317.6	18.2	1.13
108	.95038	319.9	67.4	1.48	.94154	309.6	27.4	1.41	.93281	311.1	11.6	1.12
109	.95973	320.3	43.5	1.02	.96045	315.7	25.3	1.19	.95233	317.8	13.3	1.05
110	.95701	321.2	62.3	1.61	.94900	313.2	35.5	2.05	.92998	311.1	18.0	1.87
111	.94735	316.9	53.7	1.42	.93648	307.2	22.1	1.33	.93407	311.4	9.6	.96
112	.94867	316.5	46.6	1.24	.94557	310.0	19.2	1.08	.94295	314.3	10.2	.93
113	.95044	316.1	38.2	1.02	.94944	311.3	19.8	1.05	.94418	315.0	12.1	1.00
114	.95215	316.9	37.4	1.01	.94877	311.5	23.7	1.18	.94340	315.0	14.1	1.03
115	.95250	317.2	39.6	1.05	.95019	312.2	25.3	1.27	.94340	315.2	15.7	1.18
116	.95274	317.5	41.1	1.08	.95198	312.8	24.9	1.24	.94368	315.4	15.9	1.13
117	.96688	323.5	51.3	1.03	.96552	317.1	22.7	1.04	.95367	317.9	9.8	1.17
118	.96608	323.4	49.8	1.00	.96598	317.3	22.9	1.04	.95619	318.6	8.2	.93
119	.96972	324.9	53.7	1.07	.96784	317.8	23.1	1.04	.95829	319.2	8.8	.98
120	.96644	325.1	65.0	1.29	.96649	318.1	28.4	1.32	.95717	319.2	11.4	1.44
121	.96446	324.6	66.8	1.33	.96218	316.9	32.1	1.51	.95226	317.7	12.1	1.69
122	.95671	320.7	56.2	1.16	.95771	314.6	25.1	1.28	.95170	316.9	8.4	1.03
123	.95833	321.0	53.1	1.10	.95786	314.6	23.9	1.21	.95024	316.4	7.4	.90
130	.96814	330.2	49.2	1.11	.96061	317.0	25.1	1.06	.95198	318.4	13.1	.96

[a] h measured in J/m^2-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(c) Configuration 9; $P_2 + M_2$ reversed - Concluded

Thermocouple	M = 2.49; T_t = 398° K; p_t = 155 180 N/m²				M = 3.51; T_t = 394° K; p_t = 258 410 N/m²				M = 4.44; T_t = 379° K; p_t = 417 899 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
131	.95088	321.2	52.1	.94	.94847	313.9	30.0	.93	.94180	315.3	15.5	.88
132	.95620	323.8	61.5	1.19	.94028	316.6	36.8	1.13	.92246	309.9	21.2	1.11
133	.93828	311.0	17.8	.44	.94059	307.7	10.0	.56	.93201	310.0	3.9	.39
134	.95642	322.0	45.1	.97	.95428	315.1	25.3	.92	.94901	317.5	13.5	.80
135	.94506	319.6	37.2	.98	.94229	309.0	13.5	.75	.93902	312.6	6.3	.67
136	.95767	329.1	73.7	1.20	.95362	319.1	40.7	1.40	.94719	318.2	19.6	1.23
137	.97921	332.4	50.3	1.24	.97637	324.5	20.6	1.16	.95913	320.6	10.0	1.09
300	.93281	313.5	59.4		.92732	304.8	24.3		.92794	309.5	11.4	
301	.93887	313.6	41.1		.93641	306.6	14.9		.93216	310.3	6.1	
302	.93392	312.1	50.0		.93046	305.2	21.4		.92874	309.1	7.4	
303	.92411	307.6	39.2		.91095	297.7	12.9		.90622	301.4	5.9	
304	.93186	311.0	46.0		.92606	303.4	18.4		.91780	305.6	8.6	
305	.93916	313.4	38.4		.93716	307.2	17.2		.92640	308.7	7.8	
306	.92374	314.0	95.0		.90156	299.1	48.2		.89411	300.3	24.1	
307	.93370	314.9	69.9		.92427	305.5	37.0		.91466	306.1	18.8	
308	.94521	318.8	56.2		.93991	309.8	29.6		.92727	310.0	14.5	
309	.91675	312.2	99.7		.89412	297.2	51.5		.88368	297.4	27.8	
310	.93053	314.6	74.8		.92093	305.1	41.1		.90840	305.0	22.7	
311	.94963	318.6	56.6		.94148	310.3	30.6		.92560	309.5	16.3	
312	.91607	308.8	77.8		.89016	294.4	41.5		.87187	292.5	26.1	
313	.94698	317.3	56.2		.93581	307.9	28.8		.91553	305.9	15.9	
314	.93362	321.0	108.5		.92292	314.1	82.7		.90139	306.6	58.2	
315	.95686	326.6	114.0		.94125	315.6	80.7		.91627	310.2	52.3	
316	.95331	333.7	127.1		.93559	320.0	88.0		.90897	308.9	57.6	
317	.95938	337.5	162.0		.93730	321.6	110.3		.91161	310.6	71.7	

[a] h measured in J/m²-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(d) Configuration 10; $P_2 + M_3$

Thermocouple	M = 2.49; T_t = 398° K; p_t = 155 467 N/m²				M = 3.51; T_t = 394° K; p_t = 256 878 N/m²				M = 4.44; T_t = 382° K; p_t = 416 750 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.96300	321.0	46.4	1.02	.95866	318.9	22.5	.94	.94427	314.5	13.5	.86
2	.96586	322.2	48.4	1.02	.96135	319.5	21.0	.94	.94633	314.7	11.4	.90
3	.96819	323.0	50.7	1.07	.96610	321.0	21.7	.99	.95121	316.1	10.4	.91
4	.96812	322.7	45.8	1.01	.96764	321.5	22.1	1.02	.95398	317.0	10.0	.88
5	.96805	322.9	47.4	1.02	.96771	321.6	21.7	.99	.95503	317.4	10.4	.86
6	.96777	323.0	49.2	1.03	.96764	321.7	22.1	.96	.95560	317.6	10.8	.95
7	.96741	322.6	47.2	1.02	.96751	321.6	20.8	.94	.95602	317.8	10.0	.88
8	.96728	322.6	47.4	1.01	.96771	321.5	21.0	.93	.95630	317.8	9.8	.86
9	.96692	322.6	48.4	1.03	.96744	321.6	21.9	.96	.95643	317.9	10.8	.96
10	.96663	322.3	47.0	1.02	.96716	321.3	21.2	.96	.95637	317.8	10.6	1.02
46	.93384	315.4	85.8	1.90	.91134	304.2	32.1	1.74	.91053	302.9	14.9	1.97
47	.93378	315.1	84.0	1.89	.91333	304.9	32.9	1.83	.91089	302.9	14.3	1.84
48	.93393	315.4	85.4	1.87	.91553	305.9	35.3	1.94	.91192	303.2	14.5	1.92
49	.93393	315.3	85.2	1.85	.91721	306.6	36.4	1.93	.91228	303.4	14.9	1.66
50	.93281	315.0	85.2	1.85	.91730	306.9	35.1	1.76	.91103	303.2	14.7	1.50
51	.92935	312.5	75.6	1.88	.91442	305.5	33.1	1.98	.90805	302.1	14.5	1.82
52	.93296	314.9	84.2	1.75	.91700	306.9	36.2	1.67	.90834	302.3	14.9	1.83
53	.93141	313.7	76.2	1.80	.92208	308.7	36.2	1.86	.91432	304.6	16.3	1.57
54	.96500	322.0	47.8	1.02	.95980	319.3	21.4	.90	.94501	314.6	13.3	.97
55	.96783	323.0	49.0	1.03	.96700	321.6	22.1	.92	.95503	317.6	11.4	.88
56	.96721	322.7	47.6	1.02	.96588	321.3	22.9	.93	.95433	317.4	12.9	.95
57	.96770	322.6	45.6	1.01	.96616	321.4	22.1	.92	.95426	317.4	12.9	.93
58	.96799	322.7	46.0	1.02	.96616	321.5	24.1	.95	.95369	317.2	14.1	.97
59	.96870	323.2	46.8	1.03	.96616	321.8	24.9	.97	.95224	317.0	14.5	.91
60	.96925	323.4	47.4	1.02	.96716	322.0	24.1	.96	.94983	316.1	14.7	.83
61	.96663	322.5	48.2	1.02	.96729	321.6	22.3	.95	.95692	318.2	10.8	.91
62	.96586	322.2	46.8	1.01	.96645	321.4	22.3	.93	.95657	318.1	11.6	.92
63	.96670	322.4	46.4	1.02	.96722	321.8	22.9	.93	.95707	318.4	12.1	.89
64	.96712	322.6	46.6	1.02	.96716	321.9	24.5	.93	.95531	317.8	13.1	.85
65	.96592	322.2	46.6	1.01	.96673	321.5	23.3	.97	.95714	318.2	12.3	.97
66	.96699	322.5	46.6	1.03	.96716	322.0	26.1	1.04	.95566	317.9	13.7	.91
67	.96570	322.2	47.8	1.03	.96729	321.5	22.1	.99	.95720	318.1	10.4	.98
68	.96557	322.0	46.8	1.02	.96658	321.4	23.7	1.01	.95714	318.1	11.6	.95
69	.96586	322.2	45.6	1.02	.96630	321.5	22.5	.89	.95650	318.1	12.1	.91
70	.96564	322.0	45.8	1.02	.96588	321.4	23.9	.94	.95560	317.8	12.5	.94
71	.96706	322.6	46.2	1.03	.96736	322.0	25.7	1.02	.95602	318.0	13.5	.92
72	.96783	322.7	45.8	1.03	.96800	322.1	25.3	1.03	.95510	317.7	14.3	.91
73	.96699	323.0	50.3	1.04	.96665	321.9	26.4	1.02	.95247	317.0	15.1	.83
74	.96472	321.5	47.8	1.06	.96623	321.1	21.2	.86	.95700	318.0	10.6	.83
75	.96677	322.5	48.2	1.07	.96736	321.9	23.9	.96	.95587	318.0	12.5	.80
77	.96570	322.1	47.4	1.02	.96764	321.6	21.0	.93	.95762	318.2	10.0	.80
78	.96614	322.1	44.5	1.03	.96694	321.5	23.1	.97	.95531	317.6	12.7	.89
79	.96912	323.2	46.2	1.05	.96848	321.7	20.6	.94	.95832	318.4	10.2	.86
80	.96614	322.0	44.7	1.03	.96716	321.6	23.7	1.00	.95545	317.6	12.1	.86
81	.96777	323.8	56.8	1.27	.96539	322.1	29.6	1.36	.95819	318.9	13.3	1.18
82	.96599	322.0	44.7	1.04	.96744	321.6	22.3	.95	.95560	317.7	11.6	.85
84	.97054	326.6	77.0	1.73	.96376	324.5	41.9	1.92	.95106	317.9	23.3	2.00
85	.96550	322.6	52.5	1.21	.96581	321.7	25.5	1.18	.95777	318.4	10.8	.93
86	.96783	322.8	46.6	1.08	.96673	321.2	22.9	1.04	.95560	317.6	11.4	.89
87	.96550	321.8	44.5	1.03	.96694	321.4	23.1	.99	.95496	317.4	12.7	.91
88	.96614	321.9	44.5	1.04	.96786	321.7	22.1	.97	.95433	317.2	12.9	.88
89	.96657	322.4	45.6	1.02	.96815	322.5	22.7	.98	.95282	316.9	12.9	.82
90	.96614	322.5	51.5	1.10	.96722	321.7	22.9	.97	.95158	316.6	13.9	.78
91	.95408	321.0	58.2	1.28	.95109	317.5	29.8	1.39	.93822	312.8	17.2	1.24
92	.96685	323.5	57.4	1.31	.96912	323.1	24.3	1.05	.95630	318.0	11.6	.78
94	.94485	315.9	53.5	1.23	.93971	313.2	27.8	1.32	.92528	308.0	15.9	1.47
95	.95377	319.1	55.2	1.26	.95388	317.9	28.6	1.37	.94128	313.3	15.3	1.29
96	.96072	321.5	56.0	1.30	.95851	320.1	32.7	1.48	.94318	314.7	20.0	1.46
97	.96379	320.9	42.3	1.36	.96256	320.2	24.1	1.55	.94785	315.4	13.9	1.42
98	.96586	323.6	61.9	1.40	.96716	322.1	25.7	1.12	.95362	317.2	13.1	.91
99	.96663	323.1	52.1	1.16	.96864	321.9	21.4	.93	.95180	316.5	13.5	.86
100	.96599	322.5	49.0	1.07	.96687	321.3	21.2	.93	.95028	316.0	13.9	.86
101	.91170	302.7	36.0	.81	.92405	305.4	12.7	.65	.92346	306.1	5.3	.51
102	.96248	321.9	52.3	1.20	.96539	322.2	31.3	1.43	.95034	316.8	19.0	1.55
103	.92514	311.9	82.3	1.79	.91523	305.1	29.8	1.49	.91228	303.1	12.5	1.27
104	.94057	313.9	48.8	1.10	.95087	315.7	20.4	1.02	.94253	313.1	10.6	1.06
105	.95362	319.4	47.8	1.07	.95704	318.0	21.4	1.05	.94449	313.7	10.2	.93
106	.95872	320.1	48.6	1.10	.96517	321.4	25.7	1.18	.95217	317.0	14.5	1.11
107	.96570	323.0	56.8	1.28	.96680	322.3	27.6	1.29	.94881	316.0	17.0	1.05
108	.93362	313.9	71.5	1.57	.92252	307.5	28.4	1.46	.91243	303.6	15.3	1.47
109	.95710	319.2	46.6	1.09	.96440	320.7	23.1	1.09	.95297	316.8	13.7	1.08
110	.92788	310.9	62.5	1.62	.91913	305.6	25.3	1.46	.90775	302.1	14.5	1.51
111	.94108	314.1	53.3	1.41	.93771	311.8	23.7	1.43	.93236	310.0	12.1	1.20
112	.94698	315.7	48.6	1.29	.94515	313.8	20.2	1.14	.93989	312.3	10.8	.98
113	.94721	315.0	40.9	1.09	.95205	316.1	19.4	1.03	.94253	313.4	11.4	.95
114	.95024	316.3	41.7	1.12	.95117	316.2	21.9	1.09	.94377	313.9	12.9	.94
115	.94972	316.2	43.5	1.16	.95410	317.4	23.3	1.16	.94442	314.4	15.9	1.20
116	.95208	317.0	42.5	1.12	.95719	318.7	24.9	1.24	.94253	314.0	17.0	1.20
117	.96712	323.0	51.9	1.05	.96764	321.6	21.7	.99	.95454	317.2	10.0	1.20
130	.96557	324.4	48.8	1.10	.96411	322.2	23.1	.97	.95254	317.5	12.7	.93
131	.95024	323.9	82.7	1.49	.94271	318.5	42.1	1.30	.93127	312.4	25.9	1.48
132	.96085	325.0	63.9	1.23	.96228	322.9	30.4	.93	.94991	317.4	16.3	.85
133	.93097	307.6	15.3	.38	.93808	309.7	7.6	.42	.92719	307.3	4.5	.45
134	.95857	322.0	46.0	.98	.95359	319.5	26.1	.95	.93711	313.2	17.2	1.01
135	.93053	319.2	71.7	1.89	.92706	310.8	27.2	1.51	.93157	310.1	11.8	1.26
136	.96285	326.1	67.8	1.10	.96170	322.6	29.6	1.02	.94976	317.1	15.1	.95
137	.96486	323.3	42.5	1.05	.96504	321.2	17.0	.95	.95247	316.9	9.0	.98
400	.96408	334.4	118.9		.94639	324.7	63.9		.91871	310.9	44.1	
401	.95607	326.9	125.6		.93860	318.2	63.5		.91111	306.9	40.4	
402	.95068	331.0	210.2		.92464	321.3	136.7		.89738	307.6	94.4	
403	.94691	330.2	224.5		.91913	321.1	161.4		.89503	312.6	115.8	

[a] h measured in J/m²-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(d) Configuration 10; $P_2 + M_3$ - Concluded

Thermo-couple	M = 2.49; T_t = 398° K; p_t = 155 467 N/m^2				M = 3.51; T_t = 394° K; p_t = 256 878 N/m^2				M = 4.44; T_t = 382° K; p_t = 416 750 N/m^2			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
404	.94011	324.1	163.0		.91361	313.0	98.3		.89022	305.1	67.2	
405	.95489	324.9	110.5		.93779	317.1	56.8		.91257	306.8	37.4	
406	.91784	308.0	80.1		.89275	299.6	53.1		.87494	293.6	32.7	
407	.92299	309.6	69.3		.89958	300.4	35.3		.88101	295.3	22.5	
408	.94417	315.0	52.5		.93015	309.4	25.3		.90753	302.0	14.3	
409	.91591	309.1	82.7		.90002	301.7	39.8		.88685	296.7	19.8	
410	.91902	310.1	80.9		.90421	302.7	36.4		.89130	297.0	16.3	
411	.94189	315.7	60.5		.93221	310.7	27.0		.91374	304.1	13.5	
412	.91258	300.7	14.7		.91346	300.9	6.1		.90621	299.8	2.5	
413	.92891	307.2	22.5		.93118	307.5	9.6		.91790	304.2	4.9	
414	.92367	305.0	19.8		.92802	306.0	6.5		.91936	304.3	2.5	
415	.91769	308.0	43.7		.93456	309.1	9.8		.93683	310.2	2.5	

[a] h measured in J/m^2-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(e) Configuration 11; $P_2 + M_4$ reversed

Thermo-couple	M = 2.49; T_t = 399° K; p_t = 155 419 N/m²				M = 3.51; T_t = 396° K; p_t = 258 027 N/m²				M = 4.44; T_t = 379° K; p_t = 417 324 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.95673	319.4	46.8	1.03	.94736	313.5	25.5	1.07	.93438	312.0	15.7	1.00
2	.95982	320.7	49.2	1.03	.94929	314.0	24.1	1.07	.93743	312.6	13.1	1.03
3	.96263	321.4	48.6	1.03	.95365	315.3	23.5	1.07	.94625	315.4	11.6	1.02
4	.96305	321.4	46.0	1.02	.95773	317.2	23.3	1.08	.95552	318.9	12.7	1.11
5	.96617	322.5	46.8	1.00	.96379	319.1	26.1	1.20	.96436	322.5	17.8	1.47
6	.97072	324.9	54.7	1.15	.96955	322.0	33.5	1.45	.97418	326.0	20.0	1.75
7	.97517	327.1	60.7	1.31	.97625	325.7	37.2	1.69	.98387	329.1	19.8	1.73
8	.98036	329.7	69.5	1.48	.98321	327.1	41.1	1.81	.99228	331.9	18.6	1.63
9	.98320	331.5	76.8	1.63	.99019	330.4	38.8	1.70	.99621	333.4	19.8	1.76
10	.98603	331.6	72.1	1.56	.99375	330.5	38.4	1.74	.99509	333.1	20.8	2.00
11	.98816	332.5	72.1	1.59	.99304	330.4	39.8	1.79	.99319	332.6	21.7	2.47
12	.98639	332.4	77.4	1.67	.98983	329.7	43.5	1.94	.99038	332.0	24.3	2.16
13	.98590	333.2	84.6	1.76	.98790	329.9	51.1	2.19	.98961	332.2	26.6	2.28
14	.98455	333.4	90.5		.98699	331.5	53.1		.98843	332.0	28.8	
15	.98688	335.1	101.5	2.13	.98919	331.5	62.5	2.83	.98597	332.0	30.2	2.64
16	.99058	336.7	105.2	2.24	.98628	331.5	55.0	2.51	.97832	328.3	27.4	2.48
17	.98716	334.9	99.1	2.09	.97823	327.0	52.9	2.38	.97137	326.2	30.0	2.72
18	.99213	338.2	115.6	2.47	.98777	332.6	72.1	3.36	.98378	332.5	45.4	4.27
19	1.00000	351.5	199.2	4.26	1.00000	350.1	128.7	5.94	1.00000	346.6	83.8	7.88
48	.94006	315.5	62.5	1.37	.93345	309.4	30.8	1.70	.93516	312.1	15.5	2.05
49	.94022	315.6	62.7	1.36	.93169	308.7	29.8	1.59	.93232	311.1	13.9	1.55
50	.93807	314.7	60.5	1.31	.92910	307.9	29.0	1.45	.92918	310.0	13.5	1.38
51	.94153	315.8	61.3	1.52	.92916	307.1	24.3	1.45	.92766	309.1	11.0	1.38
52	.94175	316.1	64.3	1.33	.92954	308.5	32.3	1.49	.92621	309.1	14.1	1.73
53	.94037	315.3	59.2	1.40	.93050	308.4	28.4	1.46	.92598	309.1	13.7	1.31
54	.95857	320.4	48.4	1.03	.94767	313.6	24.9	1.04	.93481	312.0	14.7	1.07
55	.96305	321.7	48.4	1.01	.95758	316.7	24.9	1.04	.95258	318.2	16.5	1.27
56	.96101	321.0	47.8	1.02	.95248	315.2	26.1	1.06	.94517	315.3	13.7	1.02
57	.96079	320.7	46.4	1.03	.95248	315.2	25.3	1.06	.94378	314.9	13.7	.99
58	.96116	320.7	46.4	1.03	.95270	315.3	27.0	1.06	.94298	314.7	14.9	1.03
59	.96190	321.3	47.0	1.03	.95299	316.4	28.0	1.09	.94181	314.5	16.3	1.03
60	.96175	321.3	48.2	1.04	.95285	315.5	28.8	1.15	.93919	313.7	17.2	.97
61	.97320	330.9	83.6	1.76	.97325	326.5	49.4	2.10	.97201	327.2	26.8	2.26
62	.96660	323.8	57.0	1.23	.95654	317.9	35.7	1.50	.94751	317.5	23.9	1.89
63	.96405	321.9	46.8	1.03	.95587	316.4	25.7	1.04	.94961	316.9	14.1	1.05
64	.96087	320.9	46.8	1.03	.95285	315.6	28.0	1.06	.94508	315.4	15.7	1.03
65	.97127	327.5	79.7	1.73	.96408	323.5	49.6	2.08	.95721	321.7	30.6	2.42
66	.96109	320.9	48.8	1.08	.95285	315.5	27.6	1.10	.94545	315.6	15.7	1.04
67	.97930	331.8	94.6	2.03	.98407	330.9	56.6	2.54	.98323	330.6	33.7	3.17
68	.97717	330.3	89.1	1.94	.97083	325.7	50.9	2.17	.96458	323.6	27.2	2.22
69	.96475	324.7	72.5	1.62	.95299	317.9	43.7	1.74	.94116	316.2	30.2	2.28
70	.96087	321.4	52.3	1.16	.95092	315.5	30.8	1.22	.94211	315.0	18.6	1.40
71	.96327	321.7	47.8	1.07	.95351	315.7	27.2	1.07	.94612	315.7	15.1	1.03
72	.96146	321.0	46.0	1.04	.95329	315.6	27.2	1.11	.94473	315.2	15.5	.99
73	.95960	321.0	49.6	1.03	.95121	315.1	27.6	1.07	.94173	314.5	16.3	.90
74	.98107	331.0	79.5	1.76	.97667	325.7	45.6	1.84	.97405	326.5	25.9	2.02
75	.96340	322.4	52.7	1.17	.95432	316.1	27.8	1.11	.94634	315.9	15.9	1.03
76	1.00000	349.8	189.4	4.12	1.00000	347.6	120.1	5.60	1.00000	344.7	81.3	7.11
77	.97936	330.6	80.5	1.74	.98043	327.3	46.8	2.06	.98323	330.2	30.4	2.44
78	.96166	322.3	57.0	1.32	.95121	315.7	34.9	1.47	.94239	315.1	19.6	1.37
79	.96269	324.4	76.2	1.73	.96927	322.8	43.7	1.98	.97319	326.4	26.1	2.21
80	.96204	323.0	66.6	1.54	.94914	315.7	38.2	1.61	.93780	314.3	24.1	1.71
81	.94854	319.4	73.5	1.64	.95388	318.4	39.4	1.80	.95686	320.3	21.7	1.93
82	.96094	322.6	62.5	1.45	.94973	316.1	41.5	1.77	.93627	313.9	25.9	1.90
84	.94700	318.2	66.4	1.49	.95063	315.7	35.3	1.62	.95348	318.7	20.0	1.72
85	.95645	320.0	53.1	1.23	.95217	315.4	28.8	1.33	.94954	316.7	14.3	1.23
86	.95585	320.1	55.4	1.28	.94767	314.4	32.3	1.46	.93830	313.4	17.6	1.37
87	.95813	321.3	61.9	1.43	.94841	315.5	38.0	1.63	.93488	313.1	23.9	1.72
88	.96122	322.4	59.4	1.39	.94899	315.2	35.7	1.58	.93678	313.6	21.9	1.49
89	.96109	322.1	56.2	1.26	.95239	316.2	28.2	1.22	.94255	314.6	16.1	1.03
90	.96116	321.7	52.7	1.13	.95107	314.8	25.5	1.08	.94108	314.0	16.1	.91
91	.94103	315.5	58.6	1.29	.94048	311.8	30.4	1.42	.94138	314.2	16.8	1.21
92	.95496	319.5	56.2	1.28	.94899	314.9	31.5	1.36	.93889	313.6	17.8	1.19
94	.93505	312.0	47.2	1.08	.93316	308.4	23.1	1.10	.93349	311.0	11.8	1.09
95	.94817	317.0	50.9	1.16	.94160	311.5	26.4	1.26	.93817	312.6	11.8	1.00
96	.95540	319.6	53.1	1.24	.94795	314.2	29.6	1.34	.94064	313.9	15.1	1.10
97	.95106	316.4	38.0	1.22	.94804	313.1	21.9	1.41	.94101	313.6	11.8	1.21
98	.95629	320.0	52.3	1.19	.95136	316.6	32.9	1.42	.93962	314.1	19.4	1.36
99	.96013	321.4	53.7	1.20	.95270	316.3	33.1	1.43	.93875	314.0	20.6	1.31
100	.96004	321.7	56.4	1.23	.94885	314.7	31.5	1.38	.93700	313.2	19.6	1.22
101	.93121	310.4	43.1	.97	.93516	308.5	19.0	.97	.93371	310.9	7.8	.75
102	.95467	319.4	51.9	1.19	.94973	314.6	28.8	1.32	.94356	314.8	15.5	1.27
103	.93527	313.2	60.3	1.31	.93523	308.7	21.0	1.05	.93321	310.7	9.4	.96
104	.93336	311.5	46.4	1.05	.93035	306.7	18.4	.92	.93145	309.8	7.6	.76
105	.93932	313.4	45.4	1.02	.93450	308.5	22.7	1.11	.93130	309.9	9.8	.89
106	.95437	319.0	49.2	1.11	.94936	314.4	27.6	1.26	.94255	314.4	15.1	1.16
107	.95636	319.7	48.4	1.09	.95210	315.4	28.2	1.31	.94166	314.4	17.4	1.08
108	.93816	314.6	60.7	1.33	.93345	308.8	26.4	1.36	.93408	311.1	11.6	1.12
109	.95334	318.2	46.2	1.08	.94885	314.0	27.0	1.27	.94166	314.0	13.9	1.10
110	.93859	314.4	59.4	1.54	.93013	307.5	25.3	1.46	.92504	308.5	13.5	1.40
111	.93520	313.1	56.2	1.49	.92169	304.1	20.6	1.25	.92030	306.3	9.6	.96
112	.93579	312.2	48.4	1.29	.92295	304.4	19.2	1.08	.92197	306.9	8.4	.76
113	.94412	314.1	39.4	1.05	.93664	309.1	19.8	1.05	.93065	310.1	11.4	.95
114	.94641	315.0	39.6	1.07	.93775	309.9	22.5	1.12	.93247	311.0	14.7	1.07
115	.94692	315.3	41.3	1.10	.94033	311.0	24.7	1.23	.93531	312.2	15.9	1.20
116	.94744	315.7	42.9	1.13	.94145	311.5	25.7	1.29	.93627	312.5	16.1	1.14
117	.96204	321.7	55.2	1.11	.95527	316.0	24.3	1.11	.94393	314.7	10.4	1.24
130	.96197	327.1	73.7	1.66	.94980	321.2	44.5	1.88	.93356	316.0	32.1	2.34
131	.95562	329.2	80.7	1.46	.95551	322.7	43.7	1.35	.95636	322.0	25.1	1.43
132	.95334	322.5	61.1	1.18	.94204	315.0	34.9	1.07	.93321	313.4	21.2	1.11
133	.93490	312.0	30.4	.75	.93257	307.7	13.5	.75	.93241	310.3	6.1	.61

[a] h measured in J/m²-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(e) Configuration 11; $P_2 + M_4$ reversed - Concluded

Thermocouple	$M = 2.49$; $T_t = 399^\circ$ K; $p_t = 155\ 419\ N/m^2$				$M = 3.51$; $T_t = 396^\circ$ K; $p_t = 258\ 027\ N/m^2$				$M = 4.44$; $T_t = 379^\circ$ K; $p_t = 417\ 324\ N/m^2$			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
134	.95040	319.9	49.6	1.06	.94233	313.6	26.6	.96	.93722	313.5	14.1	.83
135	.93240	313.0	44.1	1.16	.92725	306.6	16.5	.92	.92933	309.6	7.8	.83
136	.96604	331.4	96.8	1.57	.97105	330.5	47.0	1.62	.97994	330.4	27.4	1.72
137	.99228	341.9	80.5	1.99	.98906	333.0	48.2	2.71	.98301	331.6	26.1	2.84
138	.98120	342.0	105.4	2.16	.97154	331.2	59.2	2.40	.96442	327.6	33.5	2.56
500	.93358	313.5	62.3		.92879	307.5	26.6		.93284	311.1	13.1	
501	.93358	312.5	53.7		.93169	307.7	21.2		.93451	311.2	9.8	
502	.93343	312.6	57.4		.92754	307.0	24.9		.93386	311.0	9.8	
503	.93387	310.8	40.0		.92400	304.4	16.3		.92723	308.3	7.1	
504	.92340	309.0	56.8		.92000	304.3	25.7		.92125	307.1	12.7	
505	.93047	311.5	48.8		.92761	306.8	22.1		.92678	309.0	10.4	
506	.94228	319.9	94.0		.92938	310.4	45.8		.92671	310.5	21.9	
507	.92709	314.0	87.2		.92295	307.9	44.1		.92138	308.6	24.5	
508	.93535	316.0	72.7		.93013	309.8	36.2		.92693	310.2	19.4	
509	.94096	319.9	100.5		.92791	310.6	52.5		.92344	310.0	27.6	
510	.92532	313.4	91.3		.92435	308.6	47.4		.92320	310.1	25.5	
511	.93800	317.7	86.4		.93738	313.9	41.9		.93657	313.7	21.4	
512	.93697	320.5	126.4		.92244	311.5	81.5		.91512	309.9	49.6	
514	.93564	318.9	86.0		.93997	315.4	47.6		.94560	317.2	25.7	
515	1.00000	366.0	306.2		.99488	358.5	227.0		.98751	349.2	144.0	
516	.98951	345.2	142.4		.98712	337.2	83.6		.98604	334.1	47.6	
517	.99270	347.1	150.6		.99075	339.2	88.7		.99031	336.0	50.0	

[a] h measured in J/m^2-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(f) Configuration 12; $P_2 + M_5$

Thermocouple	M = 2.49; T_t = 398° K; p_t = 154 174 N/m²				M = 3.51; T_t = 397° K; p_t = 256 159 N/m²				M = 4.44; T_t = 377° K; p_t = 413 877 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.96378	323.6	46.0	1.01	.94292	317.4	25.5	1.07	.93890	312.7	14.3	.91
2	.96668	324.9	48.0	1.01	.94538	318.0	22.9	1.02	.94088	313.0	12.1	.95
3	.96928	325.8	47.6	1.00	.94986	319.4	23.1	1.06	.94561	314.4	11.8	1.04
4	.96935	325.6	45.4	1.00	.95133	320.4	22.9	1.06	.94817	315.2	12.1	1.05
5	.96922	325.6	46.4	1.00	.95154	320.7	23.9	1.09	.94919	315.6	12.1	1.00
6	.96922	325.7	48.0	1.01	.95154	321.4	23.5	1.02	.94978	315.9	12.3	1.07
7	.96893	325.5	46.4	1.00	.95139	320.0	23.1	1.05	.95030	316.0	11.2	.98
8	.96880	325.5	47.0	1.00	.95154	320.0	23.3	1.03	.95067	316.1	11.4	1.00
9	.96843	325.5	47.2	1.00	.95154	320.1	24.9	1.09	.95095	316.2	11.4	1.02
10	.96829	325.3	47.2	1.02	.95154	320.0	24.1	1.09	.95117	316.2	11.0	1.06
11	.96893	325.4	46.8	1.03	.95294	320.4	24.5	1.10	.95286	316.7	12.1	1.37
45	.96252	326.6	79.7	1.77	.93840	316.6	32.1	1.67	.93356	310.7	17.4	2.30
46	.96153	326.1	76.0	1.68	.93454	316.3	34.1	1.86	.92924	309.2	17.4	2.30
47	.96287	326.2	72.5	1.63	.93477	316.2	33.5	1.86	.92932	309.1	16.5	2.13
48	.96386	326.4	71.3	1.56	.93586	315.9	35.1	1.93	.93041	309.6	16.5	2.19
49	.96378	326.1	69.9	1.52	.93571	315.9	35.5	1.89	.93107	309.9	15.9	1.77
50	.96118	325.0	67.6	1.46	.93324	316.8	32.9	1.64	.92946	309.5	15.9	1.63
51	.95808	322.4	56.4	1.40	.93084	313.6	29.4	1.76	.92668	308.3	13.1	1.64
52	.96061	324.7	67.8	1.41	.93026	314.5	36.2	1.67	.92522	308.1	15.9	1.95
53	.95709	322.7	57.6	1.36	.92968	313.7	32.3	1.66	.92655	308.6	16.5	1.59
54	.96598	324.7	47.2	1.00	.94378	317.7	23.7	.99	.93970	312.8	13.9	1.01
55	.96922	325.7	47.4	.99	.95063	320.0	24.5	1.03	.94941	315.9	12.3	.94
56	.96851	325.5	46.4	.99	.94951	319.6	24.5	.99	.94891	315.7	13.9	1.03
57	.96900	325.4	44.7	.99	.95034	319.8	24.1	1.01	.94891	315.7	14.1	1.01
58	.96880	325.4	45.8	1.02	.95084	320.8	26.1	1.03	.94848	315.6	15.1	1.04
59	.96957	326.0	46.6	1.02	.95139	320.5	26.4	1.02	.94730	315.4	15.7	.99
60	.97034	326.1	47.0	1.01	.95279	320.9	25.5	1.02	.94474	314.6	16.1	.91
61	.96851	325.5	47.4	1.00	.95139	320.1	23.9	1.02	.95191	316.6	12.9	1.09
62	.96781	325.1	46.0	1.00	.95028	319.9	23.7	.99	.95125	316.5	12.9	1.02
63	.96858	325.4	45.1	1.00	.95139	320.2	24.9	1.01	.95197	316.7	13.3	.98
64	.96880	325.4	45.8	1.00	.95224	320.7	26.1	.99	.95037	316.3	15.1	.99
65	.96794	325.2	45.8	.99	.95104	320.0	25.5	1.07	.95212	316.7	12.7	1.00
66	.96893	326.7	47.0	1.04	.95231	320.7	25.7	1.02	.95067	316.4	14.9	.99
67	.97125	326.8	51.9	1.11	.95511	322.4	27.2	1.22	.95592	317.9	12.3	1.15
68	.96823	325.3	46.4	1.01	.95119	320.1	25.5	1.09	.95243	316.7	12.5	1.02
69	.96794	325.1	44.3	.99	.95098	320.1	24.1	.96	.95139	316.5	12.9	.97
70	.96766	324.9	45.4	1.01	.95104	320.1	24.7	.98	.95067	316.3	13.9	1.05
71	.96900	325.5	46.0	1.03	.95244	320.7	27.2	1.07	.95110	316.5	15.3	1.04
72	.96963	325.7	45.1	1.02	.95336	321.0	26.8	1.09	.95023	316.2	15.7	1.00
73	.96886	326.0	52.5	1.08	.95273	321.0	25.9	1.01	.94752	315.5	15.9	.88
74	.96906	325.7	48.4	1.07	.95154	320.2	24.1	.98	.95256	316.7	11.8	.92
75	.96858	325.4	48.2	1.07	.95244	320.7	24.9	1.00	.95102	316.5	14.5	.93
76	.97146	327.4	55.8	1.21	.95307	321.5	30.0	1.40	.94978	316.4	15.7	1.38
77	.96906	326.0	49.6	1.07	.95161	320.6	26.8	1.18	.95271	317.1	13.9	1.11
78	.96829	325.1	43.7	1.01	.95203	320.3	24.1	1.02	.95037	316.2	13.3	.93
79	.96935	326.2	51.3	1.17	.95043	320.2	27.6	1.25	.95067	316.4	14.9	1.26
80	.96823	325.1	44.5	1.03	.95224	320.4	24.5	1.03	.95058	316.2	13.9	.99
81	.96957	327.0	57.0	1.27	.95069	321.0	33.5	1.53	.94971	316.4	17.2	1.53
82	.96851	325.2	44.9	1.04	.95259	320.4	23.3	.99	.95082	316.2	13.9	1.01
83	.97999	330.2	55.0	1.20	.96560	326.4	30.2	1.45	.96177	320.4	15.1	1.42
84	.97111	327.7	58.6	1.32	.95224	321.9	34.3	1.57	.94965	316.7	19.2	1.65
85	.96829	325.9	51.9	1.20	.94993	320.1	28.2	1.30	.95045	316.4	13.9	1.19
86	.96836	325.5	46.6	1.08	.95148	320.1	23.7	1.07	.95082	316.2	13.1	1.02
87	.96816	325.2	45.6	1.05	.95218	320.2	24.5	1.05	.95030	316.1	13.9	1.00
88	.96865	325.1	44.3	1.03	.95314	320.6	23.5	1.04	.94935	315.8	13.7	.93
89	.96893	325.5	48.0	1.07	.95364	320.9	23.5	1.02	.94796	315.4	14.1	.90
90	.96865	325.6	47.2	1.01	.95307	320.7	23.7	1.00	.94693	315.1	14.1	.79
91	.97232	328.3	63.3	1.40	.95329	322.4	34.7	1.62	.94854	316.7	19.6	1.41
92	.96928	326.1	49.8	1.13	.95392	321.1	24.9	1.08	.95169	316.6	13.7	.92
93	.95603	319.1	25.5	.56	.94292	315.9	12.9	.64	.93970	311.8	6.7	.66
94	.95667	320.7	40.2	.92	.93985	315.7	20.4	.97	.93649	311.1	9.8	.91
95	.96279	323.8	49.8	1.13	.94517	318.9	29.6	1.42	.94190	313.7	17.4	1.47
96	.96787	326.0	52.7	1.23	.95014	321.1	36.0	1.63	.94518	315.3	20.8	1.52
97	.96730	324.2	39.2	1.26	.95014	319.4	22.9	1.47	.94781	315.2	11.6	1.19
98	.96893	326.2	52.5	1.19	.95406	321.2	25.1	1.09	.94906	315.8	14.1	.99
99	.96906	326.0	49.2	1.10	.95399	320.9	22.9	.99	.94715	315.1	14.5	.92
100	.96823	325.5	47.8	1.04	.95253	320.4	23.1	1.01	.94555	314.6	15.3	.95
101	.95135	318.7	38.0	.85	.93512	313.8	18.2	.93	.93070	309.1	8.6	.82
102	.96724	325.6	51.7	1.18	.95279	321.7	34.5	1.58	.94715	315.8	20.2	1.65
103	.94512	318.2	55.0	1.20	.93099	312.9	18.8	.94	.92917	308.3	7.4	.75
104	.95244	320.0	45.4	1.02	.93855	315.4	23.1	1.15	.93692	311.4	11.0	1.10
105	.95682	321.4	45.6	1.02	.94467	318.2	23.1	1.13	.94437	313.9	11.2	1.02
106	.96316	323.4	45.6	1.03	.95253	321.0	27.6	1.26	.94891	316.1	17.0	1.30
107	.96801	326.0	52.5	1.18	.95294	321.1	27.6	1.29	.94548	314.9	17.6	1.09
108	.95878	324.5	69.3	1.52	.92663	312.2	28.8	1.48	.92303	306.8	12.3	1.18
109	.96026	322.5	44.7	1.05	.95148	320.1	24.7	1.16	.94978	316.0	14.9	1.18
110	.95823	323.5	63.3	1.64	.93158	314.6	34.5	1.99	.91836	305.9	18.4	1.91
111	.95237	320.4	54.5	1.44	.92517	311.1	24.1	1.46	.92646	308.0	11.4	1.14
112	.95266	319.9	47.8	1.27	.93564	314.4	20.8	1.17	.94029	312.6	11.8	1.07
113	.95281	319.2	40.9	1.09	.93797	315.2	21.7	1.15	.94057	312.8	12.1	1.00
114	.95420	319.7	40.0	1.08	.93840	315.6	23.1	1.15	.94088	313.1	13.9	1.01
115	.95340	319.5	40.2	1.07	.94270	317.2	24.9	1.24	.94116	313.4	17.2	1.29
116	.95611	320.4	40.4	1.06	.94568	318.4	25.3	1.27	.93947	313.0	18.2	1.29
117	.96858	325.9	50.9	1.02	.95231	320.8	23.9	1.09	.94935	315.4	11.4	1.37
118	.96816	325.7	49.8	1.00	.95364	321.2	23.3	1.06	.95197	316.2	9.4	1.07
119	.96781	325.6	50.3	1.00	.95349	320.6	22.9	1.03	.95243	316.4	9.2	1.02
120	.96801	325.7	51.1	1.02	.95371	320.5	22.1	1.03	.95191	316.1	8.8	1.10
121	.96858	326.0	51.5	1.03	.95476	320.7	21.4	1.01	.95256	316.2	8.4	1.17
122	.96710	325.6	54.3	1.12	.95602	321.9	27.2	1.39	.95197	316.4	11.6	1.43
123	.96358	322.8	38.8	.81	.95517	320.4	19.4	.98	.95557	317.2	8.6	1.05
130	.96759	327.2	47.6	1.07	.95014	321.1	24.1	1.02	.94811	316.1	13.5	.99

[a] h measured in J/m²-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(f) Configuration 12; $P_2 + M_5$ - Concluded

Thermo-couple	$M = 2.49$; $T_t = 398^\circ$ K; $p_t = 154\ 174$ N/m^2				$M = 3.51$; $T_t = 397^\circ$ K; $p_t = 256\ 159$ N/m^2				$M = 4.44$; $T_t = 377^\circ$ K; $p_t = 413\ 877$ N/m^2			
	$\frac{T_e}{T_t}$	T_w, $^\circ$K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, $^\circ$K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, $^\circ$K	h (a)	$\frac{h}{h_{(7)}}$
131	.95259	324.6	64.8	1.17	.93026	318.9	35.3	1.09	.92815	310.2	20.4	1.16
132	.96237	328.8	54.3	1.05	.94706	323.8	30.6	.94	.94643	316.3	18.6	.97
133	.95069	318.7	26.8	.66	.93652	314.5	13.9	.77	.93619	310.7	6.3	.63
134	.96400	326.0	44.7	.96	.94000	318.4	28.4	1.03	.93341	311.7	17.2	1.01
135	.94893	321.9	40.0	1.05	.92793	311.6	13.9	.77	.92961	308.6	7.4	.78
136	.96448	329.0	68.0	1.11	.94873	321.9	33.3	1.15	.94570	315.7	16.1	1.01
137	.96766	326.9	44.3	1.10	.95098	320.6	20.0	1.13	.94863	315.7	10.2	1.11
138	.98238	328.1	24.9	.51	.96483	322.7	10.2	.41	.95586	317.0	4.5	.34
600	.96019	329.5	123.2		.93746	320.2	67.2		.92157	309.3	38.2	
601	.96026	327.0	87.6		.93957	318.7	45.4		.92464	309.1	27.8	
602	.94826	327.2	128.5		.92132	317.0	86.6		.90579	305.7	54.5	
603	.94263	326.3	150.4		.91194	315.4	109.9		.89496	303.3	73.3	
604	.94591	324.6	116.0		.91732	316.7	68.0		.90308	303.3	43.3	
605	.96188	325.1	67.8		.93920	317.3	35.5		.92507	308.6	21.4	
606	.92511	309.2	28.0		.90227	301.9	14.1		.89400	296.7	9.4	
607	.93288	312.4	41.3		.91070	305.1	17.0		.90301	299.7	8.8	
608	.94885	316.7	28.4		.92990	311.2	12.7		.92077	305.5	5.9	
609	.93940	315.6	48.2		.92458	310.4	20.0		.92398	306.5	6.7	
610	.95039	318.4	39.0		.93469	313.1	15.5		.93107	308.7	5.5	
611	.93823	317.0	57.4		.92227	310.4	24.1		.92114	306.2	11.4	

[a] h measured in J/m^2-sec-$^\circ$K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(g) Configuration 13; $P_2 + M_6$

Thermocouple	M = 2.49; T_t = 400° K; p_t = 154 366 N/m²				M = 3.51; T_t = 399° K; p_t = 256 495 N/m²				M = 4.44; T_t = 382° K; p_t = 415 218 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.96405	325.1	46.0	1.01	.95625	321.6	23.3	.97	.93386	316.2	14.3	.91
2	.96700	326.5	48.0	1.01	.95869	322.2	21.9	.97	.93523	316.4	12.5	.98
3	.96980	327.2	48.2	1.02	.96344	323.7	21.0	.96	.93940	317.6	10.2	.89
4	.96974	327.1	45.8	1.01	.96498	324.7	21.2	.98	.94195	318.4	11.2	.98
5	.96952	327.1	47.4	1.02	.96512	324.3	22.1	1.01	.94265	318.7	11.4	.95
6	.96945	327.2	48.4	1.02	.96498	324.3	22.7	.98	.94327	318.9	11.2	.98
7	.96904	327.0	47.0	1.01	.96483	324.2	21.4	.97	.94368	319.0	11.0	.96
8	.96889	326.9	46.8	1.00	.96498	324.2	21.4	.95	.94390	319.1	11.4	1.00
9	.96840	326.9	47.8	1.01	.96470	324.8	22.3	.97	.94396	319.1	11.6	1.04
10	.96825	326.7	47.4	1.03	.96442	324.0	21.7	.98	.94390	319.1	11.4	1.10
11	.96777	326.5	47.0	1.04	.96448	324.0	21.0	.94	.94390	319.1	10.0	1.14
12	.96727	326.4	48.2	1.04	.96400	323.9	21.4	.95	.94340	318.9	11.2	1.00
13	.96777	326.9	49.2	1.03	.96414	324.1	22.1	.95	.94375	319.0	11.0	.95
14	.96678	326.4	49.0		.96337	323.7	21.7		.94299	318.7	10.2	
15	.96720	326.5	48.6	1.02	.96400	323.9	23.3	1.06	.94334	318.9	11.4	1.00
16	.96805	326.7	48.2	1.03	.96498	324.1	22.7	1.04	.94375	319.0	10.4	.94
17	.96770	326.6	48.2	1.02	.96470	324.6	21.9	.98	.94362	318.9	10.6	.96
18	.96700	326.4	47.2	1.01	.96420	323.9	20.6	.96	.94321	318.8	10.4	.98
19	.96672	326.2	47.6	1.02	.96400	323.7	20.8	.96	.94306	318.7	10.6	1.00
20	.96643	326.2	47.4	1.02	.96420	323.8	22.1	1.05	.94312	318.7	10.4	1.00
21	.96665	326.1	47.4	1.02	.96429	323.7	21.2	1.01	.94334	318.7	9.2	.96
22	.96665	326.2	48.0	1.04	.96442	323.8	22.5	1.07	.94347	318.9	10.4	1.06
23	.96735	326.4	49.8	1.08	.96518	324.1	20.4	.97	.94450	319.1	10.4	.93
24	.97316	329.2	53.3	1.14	.97093	326.3	22.3	1.09	.94949	320.8	10.2	.89
33	.95362	330.1	88.0	1.92	.94413	320.6	39.8	2.05	.92201	312.6	21.9	2.18
34	.95494	330.6	88.7	1.95	.94245	319.2	42.3	2.13	.91892	311.8	23.3	2.48
35	.95642	326.7	86.8	1.91	.94180	319.8	39.2	2.00	.91741	311.4	22.9	2.60
36	.95642	330.1	81.7	1.83	.94150	319.3	37.0	1.97	.91783	311.5	22.1	2.51
37	.95656	326.0	79.3	1.76	.94195	319.2	35.7	1.84	.91999	312.0	20.4	2.50
38	.95662	325.9	78.0	1.71	.94238	319.1	34.3	1.81	.92201	312.6	19.2	2.47
39	.95712	326.0	77.8	1.69	.94312	319.2	33.3	1.75	.92445	313.4	18.2	2.23
40	.95621	325.5	76.8	1.69	.94267	318.0	33.1	1.76	.92560	313.5	18.0	1.87
41	.95656	325.7	82.7	1.76	.94362	319.1	32.3	1.63	.92754	314.1	16.1	1.65
42	.95838	326.2	76.2	1.64	.94601	319.0	30.4	1.57	.93034	315.0	16.1	1.84
43	.95923	326.2	73.9	1.62	.94733	319.4	29.8	1.54	.93228	315.6	15.3	1.79
44	.95914	326.2	73.5	1.61	.94804	319.6	29.8	1.54	.93314	315.9	14.9	1.74
45	.95964	326.2	72.5	1.61	.94932	319.9	30.0	1.56	.93437	316.2	15.5	2.05
46	.95949	326.1	70.7	1.57	.95059	320.4	29.6	1.61	.93537	316.6	14.9	1.97
47	.95971	326.0	68.8	1.55	.95212	320.7	29.0	1.61	.93638	316.9	14.7	1.89
48	.95978	326.1	69.0	1.51	.95310	321.2	30.2	1.66	.93680	317.1	14.9	1.97
49	.95923	325.7	67.6	1.47	.95317	321.3	31.1	1.65	.93638	316.9	14.9	1.66
50	.95669	324.7	66.0	1.43	.95107	320.7	30.8	1.54	.93416	316.2	14.5	1.48
51	.95270	322.1	56.4	1.40	.94644	318.9	28.6	1.71	.93006	314.8	14.1	1.77
52	.95662	324.5	65.0	1.35	.94739	319.9	32.5	1.50	.92919	314.5	14.7	1.80
53	.95480	323.0	55.8	1.32	.94841	320.0	30.6	1.58	.93077	315.4	16.3	1.57
54	.96637	326.2	48.0	1.02	.95730	322.0	22.5	.94	.93437	316.2	13.7	1.00
55	.96917	327.2	48.2	1.01	.96414	324.2	23.1	.97	.94293	318.9	13.5	1.03
56	.96840	326.9	47.4	1.01	.96295	323.9	22.9	.93	.94223	318.7	12.5	.92
57	.96889	326.7	45.1	1.00	.96344	324.0	22.3	.93	.94223	318.7	13.1	.94
58	.96904	326.8	45.1	1.00	.96372	324.1	23.9	.94	.94154	318.6	14.3	.99
59	.97000	327.4	46.4	1.02	.96387	324.4	24.9	.97	.94023	318.3	15.5	.97
60	.97092	327.7	46.8	1.00	.96498	324.7	25.1	1.00	.93738	317.4	16.5	.93
61	.96825	326.9	48.6	1.03	.96448	324.2	22.9	.97	.94465	319.4	12.1	1.02
62	.96777	326.5	46.4	1.00	.96344	324.0	23.1	.97	.94409	319.2	12.9	1.02
63	.96854	326.7	46.0	1.01	.96442	324.4	23.7	.96	.94465	319.5	12.9	.95
64	.96910	326.9	45.8	1.00	.96463	324.6	24.5	.93	.94265	319.1	14.3	.93
65	.96777	326.5	46.2	1.00	.96407	324.1	22.5	.94	.94478	319.5	11.8	.94
66	.96889	326.9	45.6	1.00	.96463	324.6	24.5	.98	.94284	319.1	15.1	1.00
67	.96763	326.6	50.5	1.08	.96463	324.2	22.3	1.00	.94465	319.4	11.4	1.08
68	.96748	326.4	47.2	1.03	.96387	324.0	22.7	.97	.94450	319.4	12.5	1.02
69	.96783	326.5	45.1	1.01	.96379	324.1	22.7	.90	.94396	319.2	12.7	.95
70	.96763	326.2	45.4	1.01	.96330	324.0	23.5	.93	.94293	319.0	13.3	1.00
71	.96910	326.9	45.6	1.02	.96477	324.6	24.1	.95	.94306	319.1	14.1	.96
72	.96974	327.0	44.9	1.01	.96553	324.7	23.5	.96	.94223	318.9	14.5	.92
73	.96917	327.4	49.0	1.01	.96448	324.7	25.9	1.01	.93967	318.0	15.9	.88
74	.96672	326.0	46.2	1.02	.96344	323.7	21.9	.88	.94390	319.1	11.2	.87
75	.96860	326.7	45.4	1.00	.96477	324.5	24.1	.97	.94293	319.0	14.7	.95
76	.96763	326.4	46.8	1.02	.96498	324.1	20.6	.96	.94416	319.1	11.2	.98
77	.96755	326.4	46.4	1.00	.96448	324.1	21.9	.96	.94450	319.3	12.3	.98
78	.96834	326.4	43.3	1.00	.96448	324.2	22.9	.97	.94237	318.7	13.9	.97
79	.96678	326.0	44.9	1.02	.96400	323.8	21.0	.95	.94396	319.1	11.2	.95
80	.96812	326.4	44.1	1.02	.96470	324.2	22.9	.97	.94251	318.8	13.3	.94
81	.96573	325.7	45.8	1.02	.96289	323.4	20.8	.95	.94293	318.7	11.4	1.02
82	.96818	326.4	44.5	1.03	.96498	324.2	22.5	.96	.94251	318.7	13.5	.99
83	.97085	329.1	50.5	1.10	.96708	324.6	20.0	.96	.94589	319.6	10.4	.98
84	.96650	325.9	45.4	1.02	.96379	323.7	20.8	.95	.94362	319.0	11.2	.96
85	.96595	325.6	43.9	1.01	.96280	323.4	21.2	.98	.94258	318.6	11.0	.95
86	.96580	325.5	43.1	1.00	.96309	323.6	21.0	.95	.94202	318.5	11.8	.92
87	.96735	326.1	44.1	1.02	.96442	324.0	22.1	.95	.94174	318.5	13.1	.94
88	.96840	326.4	43.1	1.00	.96547	324.4	21.7	.95	.94098	318.2	13.7	.93
89	.96895	326.9	44.9	1.00	.96582	324.6	23.7	1.03	.93954	317.8	14.7	.94
90	.96889	327.0	47.6	1.02	.96498	324.5	24.5	1.03	.93837	317.5	15.7	.89
91	.96398	326.2	56.6	1.25	.95743	322.9	29.8	1.39	.93878	318.0	17.2	1.24
92	.96805	326.4	44.5	1.01	.96575	324.5	22.3	.96	.94251	318.7	13.7	.92
93	.95936	322.7	38.2	.84	.95372	319.5	14.9	.74	.93055	314.1	7.8	.76
94	.96300	324.9	47.4	1.09	.95869	322.5	24.1	1.15	.93537	316.4	13.5	1.25
95	.96433	325.8	50.9	1.16	.96016	323.2	25.9	1.25	.93891	317.7	15.1	1.28
96	.96595	326.2	48.6	1.13	.96359	324.1	23.9	1.08	.94230	318.6	13.7	1.00
97	.96608	324.4	32.5	1.05	.96463	323.1	15.7	1.01	.94182	318.1	9.2	.94
98	.96834	326.6	45.4	1.03	.96582	324.5	21.9	.95	.93995	317.9	13.5	.94
99	.96818	326.5	44.9	1.00	.96582	324.5	22.1	.96	.93829	317.4	14.3	.91

[a] h measured in J/m²-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(g) Configuration 13; $P_2 + M_6$ - Concluded

Thermo-couple	$M = 2.49$; $T_t = 400^\circ$ K; $p_t = 154\ 366\ N/m^2$				$M = 3.51$; $T_t = 399^\circ$ K; $p_t = 256\ 495\ N/m^2$				$M = 4.44$; $T_t = 382^\circ$ K; $p_t = 415\ 218\ N/m^2$			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)		$\frac{T_e}{T_t}$	T_w, °K	h (a)		$\frac{T_e}{T_t}$	T_w, °K	h (a)	
100	.96748	326.5	46.4	1.01	.96442	324.1	21.4	.94	.93695	316.9	14.9	.92
101	.95767	323.0	47.2	1.06	.95575	321.0	21.4	1.09	.93444	315.8	10.4	1.00
102	.96678	326.4	48.2	1.10	.96553	324.6	22.9	1.05	.94223	318.7	13.9	1.13
103	.96034	324.6	55.4	1.20	.95526	320.9	21.9	1.09	.93486	316.0	11.4	1.17
104	.96265	324.7	46.8	1.06	.96239	323.2	20.4	1.02	.94223	318.4	10.6	1.06
105	.96363	324.8	44.1	.99	.96527	324.0	19.6	.96	.94353	318.8	11.8	1.07
106	.96615	325.9	45.6	1.03	.96527	324.6	24.3	1.11	.94140	318.4	13.7	1.05
107	.96707	326.4	47.2	1.06	.96588	324.4	20.6	.96	.93815	317.3	14.3	.89
108	.96175	325.2	53.7	1.18	.95854	322.1	22.1	1.14	.93850	317.2	11.6	1.12
109	.96510	325.2	41.7	.98	.96673	324.8	22.1	1.04	.94265	318.9	13.7	1.08
110	.95551	322.2	48.0	1.24	.95002	319.1	21.2	1.22	.93121	314.9	12.1	1.26
111	.96343	324.7	45.4	1.20	.95463	320.3	19.6	1.19	.93644	316.5	11.2	1.12
112	.96153	323.6	41.1	1.09	.95590	320.6	19.2	1.08	.93809	317.0	10.4	.94
113	.96166	323.4	39.4	1.05	.95533	320.4	18.6	.99	.93843	317.1	11.0	.92
114	.96111	323.0	38.0	1.02	.95680	321.1	19.4	.97	.93781	317.2	12.9	.94
115	.96076	322.9	37.6	1.00	.95778	321.7	20.2	1.01	.93565	316.6	15.1	1.14
116	.96111	323.2	38.8	1.02	.95749	321.5	20.0	1.00	.93350	315.9	14.9	1.06
117	.96882	327.2	51.3	1.03	.96518	324.2	22.5	1.03	.94230	318.6	9.6	1.15
130	.96770	330.3	46.6	1.05	.96177	324.7	23.1	.97	.93988	318.7	13.9	1.01
131	.96286	328.6	62.1	1.12	.95701	324.5	29.4	.91	.93638	317.9	16.3	.93
132	.96293	328.3	57.6	1.11	.95625	324.2	29.4	.90	.93508	317.7	17.8	.93
133	.95102	321.2	33.5	.83	.94195	316.9	16.1	.90	.91741	310.4	9.0	.90
134	.96188	326.7	46.4	.99	.95590	323.6	27.6	1.00	.93559	317.6	16.5	.98
135	.95999	326.0	47.8	1.26	.95225	320.9	19.4	1.08	.93134	315.5	11.6	1.24
136	.96490	330.3	68.4	1.11	.95974	325.2	30.6	1.06	.93774	318.4	15.1	.95
137	.96707	329.5	42.5	1.05	.96274	324.0	17.6	.99	.93988	318.1	9.4	1.02
138	.96391	328.0	53.3	1.09	.95590	323.0	26.1	1.06	.93537	317.1	13.5	1.03
700	.96980	334.6	126.4		.94904	326.2	64.6		.91316	312.2	43.3	
701	.96553	329.7	90.1		.94530	320.7	48.8		.90936	309.5	31.5	
702	.94796	336.1	124.4		.91840	320.1	78.9		.88435	304.6	51.1	
703	.95067	331.6	108.1		.92611	317.2	59.0		.89255	304.5	36.2	
704	.95662	325.7	71.1		.93606	316.6	36.4		.90189	306.2	22.5	
705	.92918	316.1	80.3		.90357	306.5	48.8		.87402	297.6	32.3	
706	.93820	318.1	68.2		.91672	309.3	36.6		.88723	300.9	20.0	
707	.94775	321.2	59.9		.93017	313.6	29.2		.89952	304.7	16.1	
708	.92699	315.5	62.9		.90634	305.8	26.8		.87991	298.1	14.1	
709	.93448	321.1	64.6		.91774	309.4	26.4		.89242	302.1	12.7	
710	.94448	319.9	51.9		.92937	312.7	22.1		.90268	305.5	11.0	
711	.93041	313.1	31.1		.91657	306.8	11.4		.89299	301.5	5.3	
712	.93420	313.8	35.5		.92363	309.3	14.3		.90053	304.1	7.8	
713	.81830	276.4	40.2		.83620	281.0	16.3		.84780	287.0	9.2	
714	.94141	315.9	27.2		.93511	312.7	9.6		.91331	308.2	4.9	
715	.93463	318.7	31.3		.93060	313.0	10.6		.91367	308.7	4.5	

[a] h measured in J/m^2-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(h) Configuration 14; $P_2 + M_7$

Thermocouple	M = 2.49; T_t = 397° K; p_t = 154 174 N/m²				M = 3.51; T_t = 395° K; p_t = 258 027 N/m²				M = 4.44; T_t = 378° K; p_t = 414 643 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.96664	325.4	46.0	1.01	.94567	314.6	25.7	1.08	.93740	313.5	13.7	.87
2	.96945	326.5	48.0	1.01	.94787	315.1	24.1	1.07	.93930	313.7	10.8	.85
3	.97191	327.3	47.6	1.00	.95215	316.5	23.5	1.07	.94418	315.2	10.4	.91
4	.97199	327.1	45.4	1.00	.95369	317.6	23.3	1.08	.94680	316.1	10.8	.95
5	.97171	327.1	46.4	1.00	.95377	317.1	24.1	1.10	.94810	316.6	11.4	.95
6	.97212	327.4	48.2	1.01	.95458	317.5	24.1	1.04	.94983	317.1	11.4	1.00
7	.97711	329.1	49.8	1.07	.95928	318.7	23.3	1.06	.95488	318.7	9.6	.84
8	.98209	330.9	50.7	1.08	.96540	321.1	27.8	1.23	.95963	320.7	14.1	1.23
9	.98997	330.7	19.2	.41	.97446	321.6	9.0	.39	.96558	321.4	2.9	.25
10	.99263	331.6	23.7	.51	.98111	323.8	8.2	.37				
46	.97331	322.9	1.6	.04								
47	.97059	322.4	5.3	.12								
48	.95667	322.7	56.4	1.23	.96037	319.3	27.0	1.48	.95648	319.1	13.1	1.73
49	.95214	323.2	74.2	1.61	.95458	320.2	40.7	2.16	.94970	317.6	18.2	2.02
50	.94696	320.8	67.2	1.46	.94722	316.3	38.2	1.91	.94105	314.7	15.9	1.63
51	.94529	320.4	68.4	1.70	.93596	312.6	36.4	2.17	.92846	310.4	14.1	1.77
52	.94375	319.9	69.7	1.44	.92242	308.3	38.6	1.78	.91543	306.4	16.8	2.05
53	.94251	318.9	61.7	1.46	.91617	306.1	36.4	1.87	.91114	305.1	17.6	1.69
54	.96938	326.5	49.8	1.06	.94663	315.0	25.7	1.08	.93842	313.6	12.1	.88
55	.97206	327.4	48.4	1.01	.95325	317.1	25.3	1.06	.94847	316.7	11.6	.89
56	.97142	327.0	47.0	1.00	.95207	316.9	26.1	1.06	.94773	316.6	12.5	.92
57	.97212	327.1	47.6	1.05	.95296	317.0	25.5	1.07	.94782	316.7	12.3	.88
58	.97191	327.0	45.1	1.00	.95325	317.2	27.2	1.07	.94738	316.6	13.5	.93
59	.97283	327.7	46.0	1.01	.95414	317.7	29.2	1.13	.94637	316.4	14.5	.91
60	.97340	327.7	46.8	1.00	.95567	318.1	29.2	1.16	.94403	315.6	15.7	.89
61	.97809	331.2	69.0	1.46	.95759	320.1	39.8	1.70	.95243	318.9	19.6	1.66
62	.97620	329.0	50.5	1.09	.95589	318.7	25.1	1.05	.95263	318.1	11.0	.87
63	.97184	327.1	48.6	1.07	.95414	317.6	28.2	1.14	.95138	317.8	12.1	.89
64	.97135	327.0	46.4	1.02	.95473	318.6	28.2	1.07	.94963	317.4	12.9	.84
65	.97697	331.1	71.3	1.54	.95493	319.6	40.2	1.68	.95173	319.0	20.2	1.60
66	.97129	327.0	45.6	1.00	.95502	317.9	28.2	1.12	.95012	317.5	12.7	.84
67	.99052	334.9	60.9	1.31	.97587	325.5	30.0	1.35	.96768	323.4	12.1	1.13
68	.97957	333.2	85.2	1.85	.95766	323.6	55.6	2.37	.94810	318.7	30.2	2.47
69	.97436	329.9	66.8	1.49	.95428	319.0	36.4	1.45	.95278	318.8	16.1	1.22
70	.97324	328.0	51.7	1.15	.95502	317.8	27.8	1.10	.95110	317.7	12.1	.91
71	.97269	327.4	45.8	1.02	.95524	317.9	28.4	1.12	.95047	317.6	13.3	.90
72	.97212	327.2	45.1	1.02	.95620	318.1	26.6	1.08	.94957	317.4	12.5	.79
73	.97114	327.4	49.8	1.03	.95552	318.2	28.2	1.10	.94708	316.6	15.7	.87
74	.97753	331.6	75.2	1.67	.95797	321.5	50.0	2.02	.94898	319.1	28.0	2.17
75	.97500	328.6	51.5	1.14	.95552	318.1	28.4	1.14	.95088	317.7	13.7	.88
77	.97480	331.1	78.6	1.70	.95825	322.9	50.0	2.21	.95158	319.9	28.4	2.28
78	.97311	328.9	61.9	1.43	.95781	318.8	28.4	1.20	.95123	317.7	12.3	.86
79	.97928	331.1	63.9	1.46	.96696	323.7	34.1	1.55	.96090	321.7	17.0	1.43
80	.97564	331.1	75.4	1.74	.95141	318.6	44.1	1.86	.94948	317.9	17.4	1.23
81	.98604	330.6	37.8	.84	.98111	324.6	16.1	.74	.97727	325.5	4.3	.38
82	.97452	330.8	77.2	1.79	.95332	320.6	56.8	2.42	.94054	316.0	28.8	2.10
84	.99522	330.9	8.4	.19								
85	.95470	323.4	66.2	1.53	.93301	312.9	47.4	2.19	.92504	310.4	26.6	2.28
86	.96967	328.2	67.8	1.57	.95229	319.1	44.1	2.00	.94200	316.2	25.7	2.00
87	.97177	329.2	70.5	1.63	.95052	319.6	55.2	2.37	.93749	315.7	35.3	2.54
88	.97452	330.7	76.0	1.77	.95156	319.0	46.8	2.06	.94287	316.2	23.7	1.61
89	.97353	329.9	69.7	1.56	.95862	319.1	27.0	1.17	.94847	316.9	14.5	.92
90	.97353	328.7	58.2	1.24	.95620	318.1	26.6	1.12	.94680	316.4	15.1	.85
92	.96398	325.3	56.6	1.29	.94993	318.4	37.8	1.64	.94097	315.2	21.0	1.41
95	.95214	322.5	66.0	1.50	.93286	312.0	40.2	1.93	.92402	309.5	20.6	1.74
96	.95149	322.2	64.8	1.51	.92045	307.5	36.4	1.65	.90801	303.6	17.0	1.24
97	.95871	321.7	38.0	1.22	.94302	312.9	20.8	1.34	.93705	312.7	10.0	1.02
98	.96356	325.1	56.6	1.28	.95032	318.2	36.2	1.57	.94149	315.1	19.4	1.36
99	.96763	327.0	58.0	1.30	.95237	318.5	40.7	1.76	.93515	313.9	26.6	1.69
100	.96881	328.0	64.3	1.40	.95119	318.7	46.2	2.02	.93530	314.0	28.0	1.73
102	.95948	324.5	61.5	1.41	.93721	312.3	30.2	1.38	.92926	310.3	12.1	.98
104	.92600	309.5	25.9	.59	.92978	307.0	8.8	.44	.94607	314.8	1.8	.18
105	.93813	315.3	41.9	.94	.93264	309.9	23.3	1.14	.93675	312.6	11.6	1.06
106	.95948	326.6	55.6	1.25	.93515	311.7	31.7	1.45	.92489	308.9	13.7	1.05
107	.96313	326.5	55.6	1.25	.95060	316.6	30.6	1.43	.94497	315.7	14.3	.89
108	.95373	323.6	76.0	1.67	.93456	310.8	27.2	1.40	.94257	314.1	5.9	.57
109	.95751	322.4	46.8	1.10	.93596	311.7	29.0	1.37	.92396	308.6	12.9	1.02
110	.95316	324.9	88.7	2.30	.93162	312.5	46.2	2.66	.92707	310.2	18.4	1.91
111	.95149	324.7	96.2	2.55	.90476	300.7	26.1	1.58	.93617	312.1	8.8	.88
112	.92249	312.0	62.3	1.66	.91927	304.4	14.9	.84	.93429	311.2	6.5	.59
113	.94090	315.7	38.2	1.02	.92904	308.6	21.4	1.14	.92286	308.2	12.5	1.03
114	.94572	317.5	38.0	1.02	.92779	308.5	24.3	1.21	.91813	306.9	13.7	1.00
115	.95201	320.0	42.7	1.14	.93184	310.2	27.8	1.39	.92387	308.7	12.5	.94
116	.95751	322.4	47.2	1.24	.93839	312.5	29.0	1.45	.93355	311.9	12.3	.87
117	.97100	327.4	50.9	1.02	.95399	317.1	24.3	1.11	.94745	316.3	10.2	1.22
118	.97008	327.1	50.0	1.00	.95546	317.5	24.9	1.13	.95062	317.2	9.2	1.05
119	.97156	329.2	70.5	1.41	.95840	319.6	33.5	1.50	.95501	319.2	13.7	1.52
120	.97184	330.9	88.5	1.76	.95493	319.6	44.1	2.06	.94693	317.1	18.8	2.36
121	.96960	329.4	76.6	1.53	.95207	318.7	45.1	2.13	.94410	316.0	18.6	2.60
122	.96060	325.2	66.0	1.36	.93544	312.6	41.7	2.13	.91988	308.2	20.6	2.53
123	.95457	320.7	41.1	.85	.93677	311.2	23.3	1.18	.92329	308.2	11.0	1.35
130	.97296	332.4	66.8	1.50	.95567	321.5	39.6	1.67	.95215	318.8	13.7	1.00
132	.96313	332.0	91.3	1.76	.93332	320.2	63.7	1.95	.91493	309.8	39.4	2.05
134	.94119	319.5	50.7	1.08	.92698	310.3	29.2	1.06	.92992	311.8	17.0	1.00
135	.95709	319.3	13.1	.34	.93413	308.4	6.3	.35	.93982	313.0	2.2	.24
136	.97724	331.2	49.0	.80	.96214	320.1	18.8	.65	.95313	318.5	9.4	.59
800	.95400	335.6	210.8		.91912	324.0	160.0		.89833	309.8	113.8	
801	.94024	327.9	165.3		.89984	312.7	124.6		.88145	300.8	76.2	
802	.95661	338.8	249.8		.92661	331.1	223.1		.90955	315.2	144.4	
803	.94338	329.5	178.5		.90175	312.4	149.9		.88059	301.7	88.7	
804	.96988	330.2	81.3		.94193	317.1	54.5		.92474	311.4	32.7	

[a] h measured in J/m²-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS – Continued

(h) Configuration 14; $P_2 + M_7$ – Concluded

Thermo-couple	M = 2.49; T_t = 397° K; p_t = 154 174 N/m²				M = 3.51; T_t = 395° K; p_t = 258 027 N/m²				M = 4.44; T_t = 378° K; p_t = 414 643 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
805	.93535	315.5	62.9		.90852	302.5	34.1		.89485	299.5	19.8	
806	.93060	315.2	73.7		.89416	298.2	36.6		.87797	294.9	20.0	
807	.95470	322.7	59.4		.92779	309.2	30.0		.91333	305.4	14.3	
808	.93666	317.9	79.7		.91441	305.5	41.9		.90983	304.4	18.4	
809	.92878	315.4	77.2		.89838	300.5	41.5		.89223	298.6	19.0	
810	.94615	319.2	48.8		.92265	306.9	23.9		.90970	303.9	10.8	
811	.95171	317.6	21.7		.93531	307.7	1.6					
812	.92958	309.7	15.9		.90926	299.8	6.3		.90678	301.6	1.6	
813	.93199	312.4	30.6		.91566	302.7	10.4		.91114	303.4	4.1	
814	.93039	309.9	12.7									
815	.95400	320.3	37.2		.94781	314.0	16.3		.95110	316.7	3.5	

[a] h measured in J/m^2-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(i) Configuration 15; $P_2 + M_9$

Thermocouple	M = 2.49; T_t = 398° K; p_t = 154 797 N/m^2				M = 3.51; T_t = 396° K; p_t = 258 122 N/m^2				M = 4.44; T_t = 384° K; p_t = 408 945 N/m^2			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.96088	322.6	45.1	1.00	.95844	317.2	24.5	1.03	.93410	317.9	13.1	.83
2	.96399	323.9	47.8	1.00	.96035	317.6	22.5	1.00	.93603	318.2	11.0	.87
3	.96709	324.9	47.8	1.01	.96483	319.0	22.1	1.01	.94085	319.9	8.4	.73
4	.96716	324.7	45.1	1.00	.96619	319.4	21.9	1.01	.94345	320.7	8.8	.77
5	.96716	324.8	47.0	1.01	.96619	319.4	22.7	1.04	.94469	321.1	10.2	.85
6	.96702	325.0	48.0	1.01	.96603	319.5	23.3	1.01	.94510	321.3	10.4	.91
7	.96659	324.7	46.8	1.01	.96603	319.4	22.7	1.03	.94551	321.4	10.0	.88
8	.96652	324.5	46.8	1.00	.96590	319.3	22.3	.98	.94579	321.5	10.2	.89
49	.96617	324.8	49.0	1.07	.96690	319.4	21.2	1.13	.94909	322.5	8.0	.89
50	.96321	323.9	49.6	1.08	.96405	318.6	21.4	1.07	.94688	321.9	9.4	.96
51	.96068	321.9	43.1	1.07	.96035	317.0	18.6	1.11	.94469	321.0	7.8	.97
52	.96370	324.1	52.9	1.10	.96087	317.9	23.7	1.09	.94283	320.4	8.4	1.03
53	.96363	323.4	45.4	1.07	.96021	317.4	21.2	1.09	.93932	319.5	10.4	1.00
54	.96279	323.6	46.6	.99	.95917	317.4	23.5	.98	.93507	318.0	12.1	.88
55	.96652	324.7	47.0	.98	.96539	319.4	23.5	.98	.94497	321.3	9.6	.73
56	.96588	324.5	46.6	1.00	.96432	319.1	24.1	.98	.94454	321.2	11.2	.83
57	.96603	324.2	44.7	.99	.96461	319.1	22.9	.96	.94461	321.2	10.4	.75
58	.96659	324.4	44.7	1.00	.96476	319.2	24.5	.97	.94454	321.3	12.1	.83
59	.96709	324.9	45.4	1.00	.96512	319.5	25.1	.98	.94366	321.1	13.5	.85
60	.96758	325.0	46.4	1.00	.96590	319.7	25.1	1.00	.94179	320.5	13.9	.78
61	.96575	324.4	47.4	1.00	.96519	319.3	23.9	1.02	.94675	321.9	10.6	.90
62	.96504	324.0	45.6	.99	.96432	319.0	24.3	1.02	.94675	321.9	10.6	.84
63	.96540	324.2	46.0	1.01	.96497	319.4	24.5	.99	.94764	322.2	11.0	.82
64	.96645	324.5	44.7	.98	.96519	319.5	25.3	.96	.94675	322.0	13.1	.85
65	.96504	324.1	48.6	1.05	.96468	319.1	23.7	.99	.94729	322.1	10.2	.81
66	.96632	324.5	47.8	1.05	.96519	319.5	25.5	1.02	.94703	322.1	11.8	.78
68	.96462	324.0	46.4	1.01	.96426	319.0	23.5	1.00	.94716	322.0	9.4	.77
69	.96476	324.0	44.5	1.00	.96448	319.1	23.5	.93	.94729	322.1	10.4	.78
70	.96498	323.9	44.9	1.00	.96419	319.0	24.9	.98	.94688	322.0	12.3	.92
71	.96652	324.5	48.2	1.08	.96539	319.5	25.3	1.00	.94723	322.2	12.3	.83
72	.96709	324.6	45.1	1.02	.96603	319.7	25.1	1.03	.94647	322.1	12.5	.79
73	.96603	324.8	48.6	1.00	.96483	319.5	25.9	1.01	.94428	321.3	14.3	.79
74	.96145	325.3	46.8	1.04	.96346	318.4	23.7	.96	.94557	321.3	11.4	.89
75	.96652	324.5	44.5	.99	.96519	319.4	25.3	1.02	.94757	322.3	11.6	.75
77	.96561	324.2	45.8	.99	.96483	319.0	22.5	.99	.94757	322.1	9.2	.74
78	.96617	324.1	43.5	1.00	.96461	319.1	24.3	1.03	.94661	321.9	12.1	.84
79	.96476	323.7	44.7	1.02	.96412	318.7	21.9	.99	.94695	321.9	10.2	.86
80	.96632	324.2	44.3	1.02	.96490	319.2	23.7	1.00	.94703	322.1	11.6	.83
82	.96588	324.1	43.5	1.01	.96468	319.0	23.7	1.01	.94703	322.0	11.8	.87
85	.96357	323.3	43.3	1.00	.96294	318.3	23.3	1.08	.94579	321.5	11.0	.95
86	.96447	323.6	46.2	1.07	.96331	318.5	22.5	1.02	.94626	321.6	10.6	.83
87	.96511	323.8	46.6	1.08	.96397	318.8	23.3	1.00	.94592	321.7	11.6	.84
88	.96610	324.1	46.0	1.07	.96519	319.1	23.1	1.02	.94557	321.6	11.6	.79
89	.96659	324.5	44.7	1.00	.96561	319.3	23.9	1.04	.94476	321.4	13.3	.84
90	.96617	324.6	47.0	1.00	.96490	319.2	23.7	1.00	.94373	321.0	12.7	.71
92	.96581	324.1	46.2	1.05	.96539	319.1	23.1	1.00	.94695	322.0	10.6	.71
95	.96264	323.1	44.9	1.02	.96206	318.1	22.5	1.08	.94476	321.2	11.2	.95
96	.96377	323.5	44.3	1.03	.96375	318.6	22.7	1.03	.94647	321.7	8.4	.61
97	.96370	321.9	31.5	1.01	.96448	317.9	15.9	1.03	.94461	320.7	7.6	.77
98	.96553	325.4	45.8	1.04	.96532	319.1	23.1	1.00	.94510	321.4	12.1	.84
99	.96568	326.5	44.7	1.00	.96539	319.1	22.9	.99	.94400	321.0	12.7	.81
100	.96476	324.1	49.4	1.08	.96405	318.8	23.3	1.02	.94263	320.5	12.7	.78
102	.96476	326.1	44.5	1.02	.96519	319.1	22.7	1.04	.94682	322.0	11.2	.92
104	.96377	323.4	43.7	.99	.96476	318.7	19.6	.98	.94778	321.9	8.8	.88
105	.96341	323.2	42.9	.96	.96483	318.6	20.2	.99	.94798	322.0	8.8	.80
106	.96462	324.9	45.1	1.02	.96532	319.0	22.3	1.02	.94675	321.8	11.0	.84
107	.96511	324.0	45.6	1.03	.96539	319.0	21.2	.99	.94407	321.1	11.8	.73
108	.96159	323.6	52.9	1.16	.96191	318.1	23.7	1.22	.94688	321.9	10.4	1.00
109	.96462	323.5	43.1	1.01	.96575	319.1	21.0	.99	.94723	322.0	9.6	.76
110	.95716	321.1	45.6	1.18	.95769	316.5	21.2	1.22	.94407	321.0	9.6	1.00
111	.96053	321.2	37.6	.99	.95998	316.6	17.2	1.04	.94517	321.0	6.9	.69
112	.95969	320.9	36.6	.97	.95754	315.9	18.2	1.02	.94345	320.5	7.8	.70
113	.95976	320.9	37.0	.98	.95710	315.8	18.6	.99	.94332	320.6	9.2	.76
114	.96011	321.1	37.4	1.01	.95800	316.2	19.2	.96	.94248	320.4	10.6	.78
115	.95989	321.2	39.0	1.04	.95785	316.3	20.0	1.00	.94076	319.9	11.6	.88
116	.95954	321.0	39.6	1.04	.95710	316.1	20.4	1.02	.93905	319.5	12.5	.88
117	.96623	325.0	51.3	1.03	.96639	319.5	22.5	1.03	.94428	321.0	8.4	1.00
130	.96420	326.2	46.6	1.05	.96184	319.4	23.7	1.00	.94523	322.1	12.7	.93
132	.96024	328.2	57.0	1.10	.95585	318.8	30.8	.94	.94104	321.4	15.5	.81
134	.95976	328.3	48.0	1.03	.95563	318.1	28.4	1.03	.94098	321.0	14.9	.88
135	.96258	325.6	48.6	1.28	.96138	318.9	20.6	1.15	.94482	321.7	10.0	1.07
136	.96229	328.1	68.8	1.12	.96043	320.1	29.8	1.03	.94125	321.2	14.5	.91
950	.96835	331.2	69.0		.96265	323.2	35.5		.93851	320.7	18.8	
951	.96603	329.7	65.8		.96021	321.0	35.3		.93554	319.5	16.8	
952	.96236	328.4	67.0		.95673	318.6	36.6		.93237	318.4	19.6	
953	.95600	325.6	61.5		.95164	316.7	34.9		.92844	316.9	17.2	
954	.94779	318.2	47.8		.94602	313.0	25.1		.92466	314.7	13.9	
955	.94487	315.7	34.3		.94440	311.3	15.9		.92415	313.9	9.4	
956	.94648	315.9	25.3		.94617	311.4	9.6		.92494	313.9	5.1	
957	.94413	317.2	31.5		.94543	311.7	12.3		.92559	314.2	5.1	
958	.96081	326.9	63.3		.95563	317.8	34.9		.93209	318.0	17.8	
959	.95439	324.3	58.6		.95076	316.9	31.7		.92808	316.5	17.0	
960	.96786	329.5	59.0		.96184	321.2	32.5		.93788	320.1	16.8	
961	.96617	328.6	57.8		.96021	319.4	30.8		.93589	319.3	16.8	
962	.96229	326.0	65.4		.95651	319.3	33.3		.93252	318.2	17.2	
963	.95593	325.4	60.1		.95164	316.7	34.9		.92859	316.9	15.9	
964	.95556	324.8	58.2		.95215	318.6	31.5		.92965	317.2	15.1	
965	.94729	318.1	47.2		.94573	313.0	25.1		.92473	314.7	13.1	
966	.94757	318.2	47.4		.94661	313.2	25.3		.92573	315.0	13.1	
967	.94339	315.4	26.4		.94455	311.1	10.6		.92487	313.8	4.5	

[a] h measured in J/m^2-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Continued

(j) Configuration 16; $P_2 + M_{10}$

Thermocouple	M = 2.49; T_t = 399° K; p_t = 155 132 N/m²				M = 3.51; T_t = 396° K; p_t = 255 585 N/m²				M = 4.44; T_t = 382° K; p_t = 413 350 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.95680	322.6	46.2	1.02	.95493	318.6	23.9	1.00	.94664	316.1	13.1	.83
2	.95996	324.0	48.6	1.02	.95716	319.2	23.7	1.05	.94876	316.6	11.8	.94
3	.96271	324.9	47.6	1.00	.96152	320.6	21.9	1.00	.95406	318.2	9.6	.84
4	.96433	325.1	45.1	1.00	.96449	321.6	21.4	.99	.95855	319.6	9.6	.84
5	.97078	328.6	56.0	1.20	.97196	324.5	25.9	1.19	.96612	322.2	10.0	.83
6	.97605	331.0	61.9	1.30	.97760	327.5	34.7	1.50	.97185	326.5	20.4	1.79
7	.98701	336.7	80.7	1.74	.98830	337.9	42.3	1.92	.98019	328.5	24.7	2.16
9	.95279	321.4	48.8	1.03	.95709	319.4	25.7	1.13	.95596	318.9	12.1	1.07
10	.95038	323.1	70.3	1.52	.94671	317.5	37.0	1.68	.93996	314.8	19.0	1.82
11	.94819	321.7	64.3	1.42	.94577	316.7	33.1	1.49	.93602	312.9	18.2	2.07
12	.94906	321.7	61.1	1.32	.94847	317.4	30.0	1.34	.93892	313.6	14.7	1.31
13	.95220	322.9	60.9	1.27	.95251	318.6	29.0	1.25	.94402	315.2	14.1	1.21
15	.95645	324.2	60.7	1.27	.95800	320.3	28.6	1.30	.95099	317.4	11.4	1.00
16	.95757	324.4	59.0	1.26	.95914	320.7	28.8	1.32	.95323	318.2	12.5	1.13
17	.95751	324.1	56.2	1.19	.95844	320.2	27.6	1.24	.95310	318.1	12.5	1.13
18	.95716	323.6	54.1	1.16	.95787	319.7	24.7	1.15	.95295	317.9	11.6	1.10
19	.95702	323.5	52.5	1.12	.95787	319.5	23.3	1.08	.95336	318.0	10.0	.94
20	.95722	323.4	51.3	1.10	.95850	319.6	22.1	1.05	.95463	318.2	8.8	.84
21	.95744	323.4	50.7	1.09	.95928	319.7	21.9	1.04	.95590	318.6	8.6	.89
22	.95751	323.6	51.7	1.11	.95976	320.0	21.7	1.03	.95686	319.0	8.0	.81
23	.95731	323.4	50.9	1.11	.95956	319.9	22.5	1.07	.95756	319.1	8.2	.73
24	.95722	323.3	50.5	1.08	.95934	319.8	22.3	1.09	.95806	319.4	9.4	.82
25	.95772	323.5	50.7	1.11	.95985	319.9	21.4	1.07	.95870	319.5	9.2	.80
26	.95878	323.8	49.6	1.09	.96062	320.6	20.4	.97	.95940	319.7	9.0	.86
27	.95871	323.6	48.2	1.09	.96027	319.9	20.2	1.03	.95903	319.6	8.6	.88
28	.95863	323.7	48.4	1.08	.96040	320.0	20.4	1.04	.95890	319.6	8.8	.93
29	.95871	323.4	47.8	1.03	.95969	319.9	21.0	1.05	.95673	319.0	8.6	.84
30	.95926	323.7	48.4	1.03	.95969	319.7	20.0	1.00	.95701	319.0	8.2	.77
31	.95898	323.7	48.6	1.06	.95956	320.2	21.0	1.04	.95730	319.1	8.4	.79
33	.95814	323.2	47.4	1.03	.95914	319.5	20.0	1.03	.95756	319.1	8.0	.80
34	.95821	323.4	47.0	1.03	.96027	319.8	19.8	1.00	.95876	319.5	8.6	.91
35	.95926	323.7	47.6	1.05	.96082	320.0	20.0	1.02	.95940	319.6	8.4	.95
36	.95898	323.5	46.6	1.05	.96027	319.7	19.6	1.04	.95876	319.5	8.0	.91
37	.95941	323.7	48.2	1.07	.96027	319.9	19.8	1.02	.95883	319.5	7.6	.93
38	.95948	323.9	48.6	1.07	.96027	319.8	20.0	1.05	.95841	319.4	7.4	.95
39	.95955	324.1	50.5	1.10	.96027	319.9	20.0	1.05	.95841	319.4	7.8	.95
40	.95807	323.6	50.5	1.11	.95886	319.4	19.8	1.05	.95730	319.0	8.0	.83
41	.95786	323.8	52.5	1.12	.95892	319.5	20.4	1.03	.95743	319.1	8.2	.83
42	.95898	324.2	53.3	1.15	.96027	320.0	21.0	1.08	.95848	319.4	7.8	.88
43	.95933	324.4	52.9	1.16	.96040	320.1	21.7	1.12	.95883	319.5	8.8	1.02
44	.95920	324.5	54.5	1.19	.95998	320.0	21.7	1.12	.95841	319.4	8.8	1.02
45	.95955	324.6	54.7	1.22	.96027	320.1	22.1	1.15	.95870	319.5	9.6	1.27
46	.95955	324.6	55.0	1.22	.96040	321.3	21.9	1.19	.95890	319.6	9.2	1.22
47	.96003	324.6	53.9	1.21	.96082	320.4	22.3	1.24	.95925	319.7	9.0	1.16
48	.96018	324.7	53.9	1.18	.96110	320.5	22.9	1.26	.95890	319.6	9.4	1.24
49	.95955	324.4	52.9	1.15	.96055	320.4	22.9	1.22	.95756	319.2	9.2	1.02
50	.95632	323.2	52.1	1.13	.95709	319.3	23.3	1.16	.95400	318.1	10.0	1.02
51	.95351	321.0	44.9	1.12	.95367	317.5	20.2	1.21	.95049	316.8	8.0	1.00
52	.95603	323.1	53.1	1.10	.95354	318.7	27.8	1.28	.94948	316.7	11.4	1.40
53	.95505	321.9	45.1	1.07	.95302	318.2	24.3	1.25	.94869	316.7	12.7	1.22
54	.95898	323.7	51.1	1.09	.95580	318.9	23.5	.98	.94759	316.3	12.3	.90
55	.97254	329.7	60.5	1.26	.97436	326.7	35.1	1.47	.96997	324.4	18.0	1.38
56	.97219	329.4	59.0	1.26	.97337	327.5	37.0	1.50	.97010	324.5	18.2	1.35
57	.97276	329.3	56.8	1.26	.97414	326.7	37.6	1.57	.97102	324.9	18.6	1.34
58	.97331	329.5	58.2	1.30	.97478	327.1	37.2	1.47	.97115	325.0	19.8	1.37
59	.97401	330.0	58.2	1.28	.97542	327.6	39.8	1.55	.97052	324.9	20.8	1.31
60	.96573	325.9	48.0	1.03	.96540	322.4	25.7	1.02	.95546	319.1	14.3	.80
61	.94965	322.9	69.5	1.47	.94686	317.6	39.4	1.68	.93864	314.1	20.0	1.69
62	.94943	322.7	69.5	1.50	.94577	317.4	38.6	1.62	.93864	314.1	21.2	1.68
63	.95038	322.9	68.0	1.50	.94708	317.9	39.0	1.58	.93929	314.5	23.1	1.71
64	.94819	321.6	63.9	1.40	.94401	316.7	36.8	1.40	.93427	313.4	22.9	1.49
65	.96846	329.6	75.0	1.62	.97209	327.0	44.7	1.87	.96660	324.1	24.5	1.94
66	.95134	322.2	62.5	1.38	.95075	318.2	31.7	1.26	.94272	315.1	17.4	1.15
67	.95744	323.9	55.4	1.19	.96075	321.3	29.0	1.30	.95526	319.2	15.7	1.48
68	.96769	322.7	15.1	.33	.97139	321.7	5.9	.25	.96969	322.2	1.8	.15
69	.95632	323.7	56.0	1.25	.95844	320.9	31.9	1.27	.95470	319.1	17.2	1.29
70	.95716	323.9	56.0	1.25	.95716	320.0	29.0	1.15	.95281	318.2	13.7	1.03
71	.95540	323.5	58.0	1.30	.95624	320.0	30.6	1.21	.95169	317.9	15.3	1.04
72	.95323	322.7	58.0	1.31	.95323	319.0	30.0	1.23	.94811	316.9	17.2	1.09
73	.96313	325.2	49.0	1.01	.96223	321.5	25.7	1.00	.95400	318.6	15.9	.88
74	.94695	321.5	67.4	1.49	.94518	316.7	35.7	1.45	.93929	314.0	17.8	1.38
75	.96791	328.7	67.8	1.50	.97119	326.5	41.7	1.67	.96835	324.3	22.7	1.46
76	.95843	323.6	49.4	1.08	.95969	319.9	21.4	1.00	.95476	318.2	8.6	.75
77	.94446	320.5	64.6	1.39	.94488	316.5	33.5	1.48	.94132	314.7	17.8	1.43
79	.94513	320.0	57.2	1.30	.94679	316.4	27.4	1.24	.94694	316.1	12.9	1.09
80	.95294	323.7	71.7	1.66	.94958	318.4	38.2	1.61	.94621	316.2	19.0	1.35
81	.94593	320.0	55.0	1.23	.94781	316.6	27.0	1.23	.94999	317.0	11.2	1.00
82	.94483	320.7	66.8	1.55	.94651	317.5	37.8	1.61	.93879	315.2	22.5	1.64
83	.95849	323.5	47.6	1.04	.96040	320.1	21.2	1.02	.95918	319.7	8.8	.83
84	.94769	320.4	52.9	1.19	.94914	316.8	25.5	1.17	.95196	317.6	11.6	1.00
85	.95849	323.2	45.4	1.05	.95921	319.6	20.8	.96	.95806	319.5	10.2	.88
86	.95891	323.5	47.0	1.08	.96167	320.8	23.1	1.05	.95911	319.6	9.6	.75
87	.94351	319.5	58.4	1.35	.94657	316.7	30.2	1.30	.94593	316.1	17.8	1.28
88	.95737	323.4	50.9	1.19	.96082	320.9	25.3	1.12	.95673	319.2	11.2	.76
89	.96334	324.5	43.1	.96	.96344	321.4	22.7	.98	.95568	318.9	13.7	.87
90	.96277	324.9	48.6	1.04	.96357	321.6	24.5	1.03	.95561	319.0	13.7	.77
91	.95090	321.4	51.9	1.14	.95134	317.3	22.9	1.07	.95288	317.7	10.4	.75
92	.95045	321.2	52.7	1.20	.95251	318.1	26.1	1.13	.95596	319.0	13.3	.89
93	.95801	323.0	45.1	1.00	.95716	318.9	20.0	.99	.95638	318.7	8.8	.86
94	.95301	321.9	50.3	1.15	.95317	317.9	21.7	1.03	.95526	318.4	9.6	.89
95	.95948	323.4	44.7	1.02	.96027	320.0	21.2	1.02	.96030	320.1	8.6	.72

[a] h measured in J/m²-sec-°K.

TABLE IV.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE WITH STRINGERS - Concluded

(j) Configuration 16; $P_2 + M_{10}$ - Concluded

Thermocouple	M = 2.49; T_t = 399° K; p_t = 155 132 N/m²				M = 3.51; T_t = 396° K; p_t = 255 585 N/m²				M = 4.44; T_t = 382° K; p_t = 413 350 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
96	.96038	323.6	44.3	1.03	.96104	320.2	20.6	.94	.96142	320.5	11.0	.81
97	.95170	319.7	36.2	1.16	.95441	317.6	17.4	1.12	.95693	318.9	8.2	.83
98	.95898	323.9	52.3	1.19	.96203	321.1	24.9	1.08	.95861	319.9	12.1	.84
99	.96271	324.4	44.1	.99	.96463	321.6	22.5	.97	.95701	319.2	12.1	.77
100	.96152	324.2	46.6	1.01	.96251	321.0	22.5	.98	.95393	318.3	13.5	.84
101	.95652	322.2	43.5	.98	.95602	318.4	19.6	1.00	.95610	318.6	8.0	.76
102	.95364	322.0	49.6	1.14	.95530	318.7	23.5	1.07	.95771	319.5	11.4	.93
103	.95716	323.0	46.2	1.00	.95558	318.5	20.6	1.03	.95533	318.4	9.0	.92
104	.95456	322.3	49.2	1.11	.95456	318.2	21.7	1.08	.95638	318.7	8.8	.88
105	.95849	323.1	44.3	1.00	.95985	319.7	20.0	.98	.95967	319.9	9.0	.81
106	.95399	322.1	49.8	1.12	.95550	318.6	22.5	1.03	.95743	319.4	11.4	.88
107	.96172	324.1	43.9	.99	.96399	321.2	20.6	.96	.95651	319.1	13.1	.81
108	.95757	323.2	49.0	1.08	.95745	319.1	21.0	1.08	.95701	319.0	8.6	.82
109	.95485	322.1	47.4	1.11	.95573	318.7	22.3	1.05	.95813	319.5	11.6	.92
110	.95379	321.2	45.8	1.19	.95206	317.2	20.6	1.19	.95126	317.1	9.4	.98
111	.95485	321.9	48.2	1.28	.95243	316.9	18.4	1.11	.95371	317.8	8.2	.82
112	.95687	321.9	42.3	1.13	.95456	317.4	16.5	.93	.95393	317.8	7.4	.67
113	.95667	321.7	40.7	1.08	.95097	316.4	18.8	1.00	.95281	317.5	7.8	.64
114	.95294	320.5	42.9	1.15	.94927	316.1	20.0	1.00	.95225	317.5	9.8	.72
115	.95476	321.0	41.1	1.09	.95463	317.9	19.4	.97	.95225	317.6	11.4	.86
116	.95680	321.3	37.8	.99	.95500	318.1	19.4	.97	.95029	317.0	11.6	.83
117	.96222	325.1	51.3	1.03	.96293	321.1	22.5	1.03	.95673	319.0	9.4	1.12
118	.96207	325.1	50.3	1.00	.96392	321.3	22.1	1.00	.95925	319.7	8.4	.95
119	.96095	324.6	50.5	1.01	.96280	320.9	21.4	.96	.95800	319.3	8.8	.98
120	.96102	324.7	51.3	1.02	.96322	320.9	21.2	.99	.95848	319.4	8.0	1.00
121	.96124	324.7	51.3	1.02	.96364	321.0	20.8	.98	.95911	319.5	7.8	1.09
122	.95667	323.7	56.4	1.16	.95914	320.0	24.7	1.26	.95393	318.0	9.2	1.13
123	.95716	323.1	49.8	1.03	.96181	320.4	21.7	1.09	.95826	319.4	9.0	1.10
130	.95214	330.0	61.7	1.39	.95330	321.7	36.2	1.53	.94651	317.8	20.4	1.49
131	.94242	322.7	65.4	1.18	.94474	318.2	32.5	1.01	.94301	315.8	15.5	.88
132	.94695	326.4	52.5	1.01	.94701	318.1	28.0	.86	.94344	315.6	14.5	.76
133	.95393	323.0	39.2	.97	.95419	318.6	17.8	.99	.95295	317.9	8.6	.86
134	.95540	324.6	46.6	1.00	.95330	319.6	24.7	.90	.95288	318.6	12.9	.76
135	.95505	323.4	39.2	1.03	.95382	318.6	18.4	1.02	.95406	318.4	8.8	.93
136	.93279	320.0	70.1	1.14	.93088	313.1	31.5	1.08	.92633	310.1	15.5	.97
137	.94769	325.1	44.5	1.10	.94847	317.7	22.3	1.25	.93864	313.9	11.8	1.29
138	.94461	328.3	55.0	1.13	.94107	317.7	31.3	1.26	.93762	314.0	15.3	1.17

[a] h measured in J/m²-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS

(a) Configuration 17; $P_2 + R_2$

Thermocouple	M = 2.49; T_t = 395° K; p_t = 154 414 N/m²				M = 3.51; T_t = 396° K; p_t = 257 692 N/m²				M = 4.44; T_t = 377° K; p_t = 415 649 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.95598	318.6	47.2	.96	.93592	310.5	25.3	.98	.91768	308.5	14.9	1.14
2	.95909	319.9	49.2	.97	.93837	311.1	23.9	.88	.91912	308.7	12.7	.94
3	.96181	320.6	48.4	.98	.94265	312.5	23.5	.88	.92347	310.0	12.1	.89
4	.96218	320.5	45.6	.94	.94427	313.0	23.1	.90	.92601	310.8	11.0	.87
5	.96218	320.7	47.2	.94	.94464	313.2	24.1	.91	.92702	311.2	12.1	.92
6	.96218	320.8	49.2	.96	.94471	313.2	24.3	.88	.92775	311.5	11.4	.86
7	.96181	320.6	47.0	.94	.94471	313.2	23.3	.88	.92818	311.6	12.3	.90
8	.96181	320.5	47.2	.95	.94486	313.2	23.9	.89	.92855	311.7	11.4	.82
9	.96152	320.5	48.0	.94	.94493	313.4	24.1	.90	.92891	311.8	11.4	.82
10	.96130	320.4	47.2	.95	.94471	313.2	23.7	.87	.92891	311.8	12.7	.94
11	.96130	320.4	46.4	.92	.94486	313.3	23.3	.87	.92904	311.8	11.6	.86
12	.96056	320.2	48.2	.94	.94449	313.2	23.9	.85	.92855	311.7	11.4	.84
13	.96100	320.6	48.8	.94	.94501	314.1	25.3	.89	.92891	311.8	12.3	.83
15	.96056	320.3	48.4	.93	.94471	313.2	23.9	.84	.92861	311.7	11.2	.86
16	.96122	320.4	47.8	.94	.94561	313.4	24.5	.90	.92926	311.8	10.8	.78
17	.96107	320.4	48.2	.94	.94545	314.0	23.9	.87	.92898	311.7	10.0	.69
18	.96056	320.2	47.2	.92	.94501	313.2	23.1	.83	.92861	311.6	10.4	.78
19	.96012	320.1	47.2	.92	.94471	313.1	22.9	.83	.92846	311.5	11.0	.81
20	.96003	320.0	47.2	.91	.94508	313.2	22.9	.83	.92868	311.6	11.0	.84
21	.95968	319.9	47.2	.91	.94515	313.2	22.7	.82	.92876	311.5	10.6	.73
22	.95953	319.9	47.4	.90	.94515	313.1	24.3	.88	.92861	311.5	9.0	.65
23	.95915	319.7	47.0	.91	.94471	312.9	22.9	.85	.92833	311.4	10.0	.77
24	.95915	319.6	47.4	.91	.94486	313.0	22.3	.81	.92840	311.5	9.8	.74
25	.95931	319.7	47.2	.92	.94530	313.1	21.4	.80	.92861	311.5	10.4	.78
26	.96003	319.9	46.0	.91	.94620	313.4	22.9	.85	.92941	311.8	10.8	.87
27	.95981	319.6	44.3	.89	.94633	313.2	20.8	.78	.92934	311.6	9.6	.72
28	.95944	319.7	44.7	.90	.94633	313.9	20.8	.78	.92904	311.6	10.0	.73
29	.95885	319.5	47.0	.88	.94649	313.5	22.1	.77	.92803	311.4	10.0	.69
30	.95885	319.6	47.6	.90	.94649	313.9	21.7	.77	.92803	311.3	9.6	.68
31	.95885	319.6	47.4	.90	.94620	313.3	21.2	.77	.92803	311.3	9.0	.65
33	.95850	319.4	47.0	.90	.94620	313.1	20.8	.76	.92818	311.3	9.6	.75
34	.95915	319.7	47.0	.91	.94699	313.6	20.8	.77	.92956	311.7	9.0	.65
35	.95968	319.9	46.0	.90	.94752	313.7	20.4	.75	.92999	311.8	9.6	.70
36	.95885	319.6	45.8	.91	.94686	313.5	20.6	.78	.92948	311.6	9.8	.75
37	.95878	319.5	46.2	.89	.94671	313.5	21.0	.76	.92941	311.6	10.2	.74
38	.95863	319.5	46.6	.89	.94642	313.4	20.8	.75	.92898	311.5	9.4	.68
39	.95878	319.6	46.4	.89	.94664	313.4	20.8	.76	.92904	311.5	9.6	.70
40	.95731	319.1	46.8	.89	.94545	312.9	21.2	.76	.92760	311.0	9.4	.69
41	.95760	319.2	47.8	.89	.94567	313.0	20.6	.74	.92760	311.1	9.8	.70
42	.95826	319.5	47.0	.89	.94620	313.3	22.1	.79	.92861	311.3	9.4	.69
43	.95850	319.5	46.8	.90	.94649	313.4	20.2	.74	.92876	311.4	9.6	.69
44	.95850	319.5	46.4	.88	.94627	313.2	20.4	.74	.92855	311.3	9.8	.73
45	.95953	319.7	44.3	.85	.94664	313.4	19.6	.72	.92904	311.4	10.2	.76
46	.96203	320.5	44.5	.87	.94833	313.9	19.4	.72	.92999	311.7	9.6	.70
47	.96436	321.7	48.8	.94	.95181	314.9	19.0	.69	.93231	312.4	9.4	.68
48	.96465	322.3	53.9	1.04	.95017	315.5	27.2	.97	.93492	313.4	9.8	.74
49	.96627	323.0	56.8	1.10	.94855	315.7	27.8	1.01	.93296	313.6	13.9	1.00
50	.96833	324.2	61.5	.93	.95107	316.0	28.2	1.07	.93253	313.5	15.7	1.26
51	.97275	328.6	56.2	.93	.95772	318.7	24.9	.74	.93847	315.4	13.7	.76
54	.95819	319.6	48.2	.96	.93659	310.7	23.9	.86	.91818	308.6	13.7	1.02
55	.96211	320.9	48.4	.96	.94398	313.2	25.1	.90	.92745	311.5	13.3	.97
56	.96144	320.5	46.6	.95	.94280	312.9	25.9	.93	.92702	311.4	14.1	.93
57	.96174	320.4	45.6	.97	.94368	313.1	25.5	.90	.92717	311.5	13.9	.92
58	.96181	320.5	46.0	.98	.94442	313.6	27.2	.93	.92687	311.4	14.9	.92
59	.96218	320.9	46.6	.97	.94486	313.9	27.4	.90	.92571	311.2	14.7	.88
60	.96306	321.0	46.8	.95	.94620	314.2	27.0	.92	.92332	310.5	15.5	.89
61	.96137	320.5	48.0	.94	.94464	313.4	24.7	.87	.92948	312.2	12.9	.91
62	.96085	320.2	47.0	.95	.94375	313.2	25.1	.92	.92911	312.0	13.7	1.00
63	.96152	320.4	46.2	.95	.94493	313.7	25.9	.89	.92999	312.4	13.9	.93
64	.96159	320.5	47.0	.97	.94589	314.2	27.6	.91	.92846	312.0	16.3	.95
65	.96100	320.2	47.2	.96	.94442	313.4	24.9	.87	.92999	312.2	13.3	.96
66	.96144	320.5	46.6	.95	.94605	314.2	27.0	.88	.92904	312.2	15.1	.90
67	.96093	320.3	47.8	.94	.94501	313.4	24.7	.89	.92984	312.2	12.1	.89
68	.96071	320.1	47.0	.93	.94427	313.3	24.9	.87	.92984	312.2	13.9	.97
69	.96107	320.2	45.4	.94	.94471	313.5	24.7	.86	.92956	312.2	12.7	.93
70	.96063	320.1	45.6	.94	.94486	313.7	26.8	.90	.92891	312.1	14.9	.96
71	.96181	320.5	45.8	.93	.94633	314.3	27.4	.89	.92926	312.2	14.9	.84
72	.96240	320.7	44.3	.91	.94723	314.5	26.4	.87	.92855	312.0	15.7	.85
73	.96181	320.9	48.8	.91	.94611	314.4	27.4	.87	.92586	311.2	16.1	.85
74	.96027	319.9	46.4	.94	.94449	313.2	24.3	.86	.92992	312.1	11.6	.78
75	.96166	320.5	45.6	.92	.94655	314.2	26.6	.87	.92919	312.2	14.3	.84
76	.96071	320.1	46.4	.93	.94530	313.3	22.9	.82	.92948	311.9	11.6	.83
77	.96115	320.2	46.6	.92	.94515	313.4	24.3	.86	.93006	312.2	11.8	.82
78	.96115	320.1	43.5	.92	.94611	313.9	25.3	.86	.92861	311.9	13.1	.78
79	.96012	319.7	44.5	.90	.94442	313.1	23.5	.84	.92956	311.9	12.7	.89
80	.96100	320.0	44.3	.92	.94627	314.0	25.3	.84	.92876	311.9	14.3	.83
81	.95900	319.5	46.0	.92	.94368	312.9	23.5	.80	.92861	311.6	11.8	.79
82	.96085	320.1	44.7	.92	.94649	314.0	24.9	.84	.92891	312.0	13.9	.84
83	.95931	319.7	46.4	.92	.94464	313.0	23.1	.84	.92855	311.5	11.6	.84
84	.95953	319.6	45.8	.93	.94442	313.0	23.5	.83	.92904	311.8	12.1	.86
85	.95931	319.5	44.3	.92	.94420	312.9	23.3	.80	.92855	311.7	12.9	.88
86	.95959	319.5	43.5	.91	.94471	313.2	23.9	.82	.92833	311.7	13.1	.84
87	.96012	319.9	44.1	.90	.94605	313.8	24.5	.81	.92833	311.7	13.9	.80
88	.96100	320.0	43.3	.89	.94708	314.1	24.3	.84	.92745	311.5	13.9	.77
89	.96159	320.4	44.7	.89	.94737	314.3	26.4	.88	.92601	311.1	14.1	.78
90	.96144	320.6	47.0	.88	.94664	314.1	25.1	.83	.92485	310.8	14.5	.77
91	.95885	319.5	46.2	.91	.94464	313.0	23.1	.80	.92868	311.7	12.1	.80
92	.96056	320.0	44.3	.90	.94708	314.1	24.7	.82	.92876	311.9	13.9	.80
93	.95863	319.4	45.6	.90	.94493	313.0	21.7	.76	.92782	311.2	11.8	.83
94	.95856	319.2	44.5	.89	.94471	313.0	22.1	.76	.92846	311.5	11.4	.79
95	.95885	319.4	44.7	.91	.94486	313.1	22.7	.75	.92855	311.5	11.8	.74

[a] h measured in J/m²-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Continued

(a) Configuration 17; $P_2 + R_2$ - Concluded

Thermocouple	M = 2.49; T_t = 395° K; p_t = 154 414 N/m^2				M = 3.51; T_t = 396° K; p_t = 257 692 N/m^2				M = 4.44; T_t = 377° K; p_t = 415 649 N/m^2			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
96	.95850	319.2	43.9	.90	.94515	313.2	23.7	.77	.92803	311.5	12.7	.78
97	.95812	317.6	31.7	.90	.94605	312.5	18.0	.79	.92752	311.0	9.0	.68
98	.96012	320.0	45.4	.89	.94723	314.1	23.9	.78	.92644	311.2	13.5	.73
99	.96071	320.1	44.7	.87	.94723	314.1	23.7	.76	.92491	310.7	14.7	.80
100	.96012	320.1	46.2	.86	.94567	313.7	24.3	.78	.92340	310.2	15.3	.82
101	.95790	319.0	44.9	.89	.94478	312.7	21.0	.74	.92788	311.2	10.4	.72
102	.95953	319.6	44.3	.88	.94693	313.9	23.3	.75	.92803	311.6	13.5	.73
103	.95782	319.3	46.4	.89	.94427	312.7	22.9	.77	.92717	311.0	10.2	.70
104	.95775	319.0	44.9	.88	.94398	312.6	21.4	.73	.92738	311.1	10.8	.70
105	.95834	319.1	44.3	.88	.94515	313.0	22.1	.74	.92840	311.5	11.2	.75
106	.95953	319.6	44.3	.87	.94693	313.8	22.9	.75	.92788	311.5	12.3	.70
107	.95981	319.7	44.3	.84	.94686	313.9	22.9	.75	.92433	310.5	13.7	.71
108	.96115	320.1	44.1	.86	.94633	313.2	20.2	.70	.92846	311.3	9.8	.68
109	.96100	319.9	42.1	.84	.94693	313.8	22.7	.72	.92788	311.4	12.3	.65
110	.97217	325.0	52.7	.89	.95609	318.2	25.7	.64	.93737	315.0	13.3	.73
111	.97302	325.1	51.3	.90	.95668	317.7	27.6	.76	.93774	315.1	13.5	.76
112	.97224	324.7	50.3	.94	.95579	317.4	26.6	.73	.93703	315.2	15.9	.96
113	.97266	324.7	49.2	.93	.95594	317.4	25.1	.74	.93767	315.5	17.0	1.00
114	.97204	326.0	51.1	.90	.95506	317.2	25.5	.68	.93789	315.7	17.8	.94
115	.97068	324.1	48.4	.87	.95432	317.2	26.8	.72	.93679	315.5	19.0	.96
116	.96920	323.6	48.6	.85	.95506	317.6	27.8	.74	.93535	315.0	19.2	.92
117	.96166	321.0	51.1	.94	.94464	313.3	24.3	.90	.92738	311.1	10.2	.83
118	.96130	321.0	49.8	1.03	.94655	313.9	24.1	.84	.92999	311.9	9.4	.55
119	.96100	320.8	51.1	1.05	.94633	313.8	24.1	.84	.93021	312.0	9.8	.72
120	.96027	320.6	50.9	1.04	.94642	313.7	23.3	.78	.92934	311.5	9.0	.54
121	.96027	320.5	51.1	1.05	.94679	313.7	22.7	.75	.92948	311.5	7.8	.45
122	.95878	319.9	49.2	.97	.94708	313.6	21.7	.70	.92904	311.3	7.6	.41
123	.96071	320.4	48.6	.97	.94826	313.9	21.0	.67	.93021	311.6	7.8	.41
130	.96012	322.3	46.2		.94243	314.4	25.7		.92659	311.9	14.3	
131	.95495	322.4	58.8		.93734	314.1	33.5		.92252	311.1	16.8	
132	.95554	324.2	56.8		.93762	314.4	34.7		.92231	311.2	18.4	
133	.95709	320.5	39.6		.94146	312.8	19.0		.92470	310.6	10.6	
134	.95363	320.4	47.8		.93585	313.0	29.4		.92093	310.3	17.0	
135	.95657	320.1	39.0		.94087	312.5	20.4		.92470	310.5	10.4	
136	.95731	323.9	62.9		.94028	314.9	32.3		.92354	311.4	15.5	
137	.95997	321.5	40.7		.94309	313.3	20.4		.92571	311.0	9.2	
138	.95620	321.6	50.0		.93644	312.7	28.2		.92123	310.1	12.9	
150	.98147	331.8	90.3	.96	.96597	325.6	51.1	.83	.94484	319.4	30.4	.78
151	.97905	331.2	92.7	.90	.96037	322.8	55.6	.86	.93955	317.9	31.9	.77
152	.97402	329.6	92.9	.88	.95048	321.5	56.6	.81	.92868	314.6	36.0	.78
153	.97046	328.4	94.0	.90	.94515	318.9	63.1	.86	.92194	312.7	39.6	.82
154	.96762	327.4	94.8	.89	.94243	318.4	66.4	.86	.91804	312.5	42.5	.83
155	.96578	327.0	97.9	.90	.94043	318.2	71.1	.88	.91484	311.1	47.4	.84
156	.96543	327.6	102.5	.87	.94050	320.4	71.1	.86	.91288	310.9	50.5	.86
157	.96649	326.9	91.5	.90	.94177	318.4	67.2	.89	.91426	311.0	44.9	.84
158	.97921	331.0	90.7	.95	.95971	324.1	54.7	.83	.93933	318.0	33.9	.79
159	.97870	335.0	89.5	.96	.95875	323.2	61.9	.86	.93709	318.1	39.4	.78
160	.97643	332.5	91.7	.92	.95778	323.4	65.2	.90	.93333	317.4	44.7	.77
161	.97559	336.5	88.7	.87	.95476	326.0	64.1	.86	.92891	316.5	48.8	.79
162	.97046	328.2	93.4	.90	.94412	318.7	65.4	.86	.92108	312.8	40.7	.80
163	.96926	327.4	87.0	.90	.94339	319.9	61.9	.82	.91992	312.7	44.5	.85
164	.97053	327.9	90.1	.91	.94265	320.5	68.2	.85	.91934	313.0	50.3	.84
165	.96891	327.5	91.1	.91	.94050	320.1	70.7	.85	.91688	312.6	54.1	.81
166	.96820	327.6	98.3	.96	.93932	318.5	76.6	.90	.91499	312.4	54.3	.74
167	.97146	326.2	69.0	.94	.94574	318.2	55.2	.92	.92123	312.9	41.1	.81
168	.96678	331.2	92.1	.90	.93740	319.7	75.2	.87	.91275	311.7	55.6	.79
169	.96423	326.2	94.2	.91	.93438	317.3	81.1	.92	.90853	310.6	58.4	.81
170	.96443	326.9	99.7	.92	.93710	321.1	71.1	.83	.91086	310.5	53.3	.87
171	.96365	325.5	90.5	.89	.93629	317.3	70.7	.84	.90948	310.1	55.6	.89
172	.96414	326.4	96.2	.92	.93571	319.7	77.8	.88	.90948	310.7	60.5	.89
173	.96277	325.6	91.7	.93	.93304	320.3	74.8	.86	.90702	310.1	58.6	.84
174	.96122	325.8	103.4	.97	.92995	318.4	82.5	.89	.90397	309.6	62.3	.78
175	.96034	326.0	106.8	.96	.93010	319.1	85.4	.94	.90078	314.0	73.5	.90
176	.97963	331.6	96.2	.92	.96237	323.1	54.1	.87	.94093	317.8	24.5	.71
177	.96947	328.3	97.2	.88	.94782	319.0	58.6	.84	.92485	312.9	33.3	.88
180	.96343	330.8	103.2		.94523	325.5	77.8		.91579	314.0	47.6	
181	.97033	333.2	81.5		.94811	322.5	54.1		.92181	314.7	39.8	
182	.96343	333.5	80.1		.93194	323.1	64.8		.90535	310.7	49.2	
183	.95850	330.1	110.7		.93016	322.2	88.5		.90100	311.0	59.4	
184	.96571	340.7	98.9		.94745	324.2	67.8		.92259	315.2	40.2	
185	.97075	339.0	81.7		.94885	325.2	50.5		.92485	314.5	32.3	
186	.96423	337.8	86.8		.93644	319.3	61.5		.91049	310.8	38.8	
187	.95953	330.8	115.8		.93312	320.9	75.2		.90644	311.0	45.4	

[a] h measured in J/m^2-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Continued

(b) Configuration 18; $P_2 + R_2 + M_1$

Thermocouple	M = 2.49; $T_t = 397^\circ$ K; p_t = 154 797 N/m^2				M = 3.51; $T_t = 396^\circ$ K; p_t = 257 117 N/m^2				M = 4.44; $T_t = 378^\circ$ K; p_t = 398 603 N/m^2			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.95778	319.3	47.8	1.01	.93638	311.8	25.5	1.01	.94043	310.8	11.6	.78
2	.96087	320.7	49.8	1.01	.93969	312.7	23.7	.99	.94381	311.5	9.4	.74
3	.96402	321.6	48.2	1.00	.94543	314.4	23.5	1.00	.95013	313.5	9.6	.80
4	.96664	322.4	48.2	1.06	.94985	316.0	23.5	1.02	.95617	315.4	8.4	.76
50	.97083	325.6	67.6	1.10	.96377	322.7	38.0	1.35	.95890	317.1	16.5	1.05
51	.97728	330.6	71.1	1.27	.97063	326.9	39.4	1.58	.96589	319.8	17.0	1.24
54	.95999	320.4	48.6	1.01	.93755	312.2	24.9	1.04	.94196	311.1	10.8	.79
55	.96451	321.8	49.0	1.01	.94705	315.3	24.7	.98	.95514	315.3	9.2	.69
56	.96265	321.1	48.4	1.04	.94513	314.7	25.5	.98	.95330	314.7	9.8	.70
57	.96294	321.0	46.0	1.01	.94587	314.9	26.4	1.03	.95330	314.7	10.6	.76
58	.96256	320.8	46.0	1.00	.94646	315.2	27.6	1.02	.95345	314.9	12.3	.82
59	.96373	321.5	47.6	1.02	.94638	315.5	27.4	1.00	.95243	314.7	11.6	.79
60	.96437	321.5	47.4	1.01	.94668	315.6	28.0	1.04	.95072	314.1	12.5	.80
61	.96664	323.1	55.4	1.15	.94933	316.9	30.6	1.24	.95500	315.9	14.5	1.13
62	.96451	322.0	51.1	1.09	.94838	316.0	26.4	1.05	.95765	316.1	10.2	.75
63	.96344	321.2	47.6	1.03	.94793	315.7	25.1	.97	.95735	316.0	9.8	.71
64	.96294	321.0	47.0	1.00	.94823	316.0	28.6	1.04	.95647	315.9	10.8	.66
65	.96528	322.4	52.5	1.11	.94771	316.1	28.6	1.15	.95684	316.1	11.8	.89
66	.96294	321.0	46.4	1.00	.94838	316.1	28.6	1.06	.95691	316.0	11.4	.76
67	.97167	327.2	63.1	1.32	.95573	319.8	33.7	1.36	.96058	318.1	15.3	1.27
68	.96608	323.1	57.2	1.22	.94779	316.5	32.7	1.31	.95603	316.1	13.9	1.00
69	.96437	321.9	49.2	1.09	.94845	316.1	26.1	1.06	.95772	316.2	10.4	.82
70	.96272	321.0	47.2	1.04	.94786	315.7	25.9	.97	.95691	315.9	10.8	.73
71	.96344	321.1	47.0	1.03	.94889	316.1	28.4	1.04	.95735	316.2	11.0	.74
72	.96366	321.2	45.6	1.03	.94911	316.1	26.6	1.01	.95662	315.9	11.6	.74
73	.96265	321.4	50.9	1.04	.94712	317.2	27.8	1.01	.95411	315.3	11.8	.73
74	.96522	323.1	59.6	1.29	.94764	317.8	36.0	1.48	.95382	315.7	14.5	1.25
75	.96366	321.2	46.8	1.03	.94926	316.2	25.9	.98	.95765	316.2	10.6	.74
77	.96670	325.7	64.6	1.39	.94838	317.7	37.0	1.52	.95382	316.0	17.8	1.50
78	.96366	321.1	47.0	1.08	.94904	315.9	24.9	.98	.95691	315.9	10.6	.81
79	.96650	323.9	62.5	1.40	.94867	317.6	38.2	1.63	.95359	315.8	17.2	1.35
80	.96395	321.5	48.4	1.09	.94954	316.1	25.5	1.01	.95750	316.0	10.6	.74
81	.96309	322.6	61.7	1.34	.94661	316.9	36.2	1.54	.95184	315.2	16.8	1.41
82	.96386	321.7	51.1	1.14	.94985	316.4	25.9	1.04	.95809	316.2	10.4	.75
84	.95984	320.5	51.9	1.13	.94381	314.8	28.6	1.22	.94926	313.8	13.3	1.10
85	.96241	322.2	60.3	1.36	.94432	316.2	36.2	1.55	.94895	314.4	17.6	1.37
86	.96422	322.6	58.0	1.33	.94579	316.2	35.5	1.49	.95206	315.0	15.5	1.19
87	.96337	321.9	54.1	1.23	.94858	316.2	29.8	1.22	.95721	316.1	10.8	.78
88	.96395	321.4	48.4	1.12	.95029	316.1	24.3	1.00	.95662	315.8	11.0	.79
89	.96386	321.4	47.8	1.07	.94985	316.2	24.3	.92	.95551	315.5	10.8	.77
90	.96294	321.2	49.2	1.05	.94845	316.5	25.5	1.02	.95441	315.1	10.8	.75
91	.95252	317.9	49.4	1.07	.94108	313.5	26.4	1.14	.94631	312.6	11.0	.92
92	.96422	322.4	56.8	1.28	.94771	317.0	33.9	1.37	.95271	315.3	14.9	1.07
94	.95557	319.0	51.3	1.15	.94204	313.7	28.8	1.31	.94572	312.3	11.4	1.00
95	.95548	319.0	50.9	1.14	.94322	314.3	27.4	1.21	.95059	313.8	11.4	.97
96	.95778	319.4	50.9	1.16	.94697	315.7	29.4	1.24	.95330	314.9	12.3	.97
98	.96316	321.9	57.6	1.27	.94858	317.1	32.3	1.35	.95212	314.9	14.5	1.08
99	.96366	322.0	58.2	1.30	.94882	316.4	28.4	1.20	.95455	315.3	11.4	.78
100	.96212	321.5	57.2	1.24	.94852	317.7	24.7	1.02	.95352	314.8	11.0	.72
101	.94847	312.4	10.0	.22	.94049	310.1	3.7	.17	.95330	313.6	1.4	.14
102	.95851	319.8	48.8	1.10	.95000	316.7	30.4	1.31	.95617	316.0	13.5	1.00
103	.94301	313.0	31.5	.68	.92710	306.9	13.1	.57	.94189	309.6	3.5	.34
104	.94950	316.2	43.5	.97	.93931	311.9	19.4	.90	.94543	311.8	8.0	.74
105	.95489	318.3	46.2	1.04	.94587	314.6	23.5	1.06	.95212	314.1	9.2	.82
106	.95785	319.5	49.0	1.11	.94917	316.2	26.1	1.14	.95669	315.9	11.4	.93
107	.96079	320.5	49.2	1.11	.95035	317.9	30.2	1.32	.95300	315.1	13.9	1.01
108	.95798	321.7	70.3	1.59	.94137	312.7	22.1	1.09	.95256	312.7	5.5	.56
109	.95954	319.8	45.6	1.08	.94904	315.9	28.6	1.26	.95684	315.7	11.0	.90
110	.98780	334.0	71.3	1.35	.96525	325.3	36.6	1.42	.97268	321.5	13.7	1.03
111	.98170	331.1	66.4	1.29	.97036	322.5	21.0	.76	.97049	320.1	12.7	.94
112	.98254	329.0	63.1	1.26	.96328	322.7	32.3	1.22	.96087	318.5	17.0	1.06
113	.98219	328.1	53.9	1.10	.95382	319.8	32.3	1.28	.96461	319.9	16.3	.96
114	.97602	326.8	61.9	1.21	.95809	321.0	31.1	1.22	.96582	320.0	15.9	.90
115	.97466	327.1	53.5	1.11	.95859	320.7	35.7	1.34	.96348	319.2	16.1	.85
116	.97367	327.5	48.0	.99	.95912	320.8	34.7	1.25	.96341	319.3	16.8	.87
117	.96344	321.6	51.5	1.01	.94823	315.2	23.5	.97	.95359	314.5	8.4	.82
118	.96300	321.7	51.5	1.03	.95094	316.1	22.5	.93	.95698	315.5	7.8	.83
119	.96466	322.3	53.7	1.05	.95175	316.6	24.3	1.01	.95868	316.2	8.6	.88
120	.96473	322.8	57.6	1.13	.95367	317.0	23.1	.99	.95890	316.1	7.8	.86
121	.96515	323.1	59.6	1.17	.95441	317.3	23.5	1.04	.95934	316.2	8.0	1.03
122	.95704	320.0	56.6	1.15	.94917	316.0	27.0	1.25	.95382	314.5	10.0	1.32
123	.96422	321.8	50.7	1.04	.95280	316.2	20.8	.99	.95986	316.4	8.0	1.03
130	.96395	324.5	56.4	1.22	.94808	317.5	26.1	1.02	.95485	316.1	12.5	.87
131	.95925	322.7	51.1	.87	.94071	315.6	28.2	.84	.94668	313.7	13.5	.80
132	.94958	320.7	64.1	1.13	.92534	311.5	34.7	1.00	.93092	309.1	17.4	.94
133	.95607	316.1	15.1	.38	.95029	314.1	9.0	.47	.95595	314.7	3.1	.29
134	.95732	320.9	41.9	.88	.94263	315.3	25.9	.88	.95044	314.6	12.5	.73
135	.94189	312.4	21.0	.54	.92858	307.2	9.8	.48	.94381	310.4	3.3	.31
136	.97367	328.0	34.1	.54	.96100	319.6	14.9	.46	.96107	317.1	6.1	.39
150	.97984	337.7	106.6	1.18	.98146	334.1	80.1	1.57	.98670	329.4	36.4	1.19
151	.97673	332.0	117.7	1.27	.97417	333.2	74.6	1.34	.97998	328.1	36.2	1.13
152	.97502	336.2	106.8	1.15	.96383	327.2	72.5	1.28	.96808	324.1	34.7	.97
153	.97318	330.2	110.7	1.18	.95816	326.6	67.6	1.07	.96087	320.9	37.2	.94
154	.97105	329.2	108.1	1.14	.95293	324.4	65.4	.98	.95374	318.6	37.2	.88
155	.96863	330.8	103.0	1.05	.94727	322.5	65.8	.93	.94661	316.2	39.6	.84
156	.96635	328.0	113.6	1.11	.94167	321.1	67.8	.95	.93916	313.8	41.9	.83
157	.96593	326.9	99.3	1.08	.94058	318.6	66.0	.98	.93748	312.8	39.8	.89
158	.99574	335.0	77.2	.85	.98217	332.2	63.1	1.15	.98407	327.4	32.3	.95
159	.98325	334.5	74.4	.83	.96412	325.1	55.0	.89	.97304	323.3	25.9	.66
160	.98651	337.0	82.9	.90	.96094	330.9	52.1	.80	.95088	318.4	40.2	.90
161	.98183	336.2	89.1	1.00	.95809	326.5	65.6	1.02	.94838	318.5	45.6	.93

[a] h measured in J/m^2-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Continued

(b) Configuration 18; $P_2 + R_2 + M_1$ - Concluded

Thermo-couple	M = 2.49; T_t = 397° K; p_t = 154 797 N/m²				M = 3.51; T_t = 396° K; p_t = 257 117 N/m²				M = 4.44; T_t = 378° K; p_t = 398 603 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
162	.97886	329.8	81.3	.87	.96815	327.7	61.9	.95	.97091	323.3	34.5	.85
163	.97416	330.4	81.3	.93	.96801	326.1	48.4	.78	.96235	320.7	29.6	.67
164	.96970	326.9	86.2	.96	.94779	320.2	55.6	.81	.95404	317.2	30.4	.61
165	.97132	327.1	83.6	.92	.95234	321.8	59.4	.84	.94301	315.1	38.8	.72
166	.97509	328.7	87.0	.89	.94823	321.4	67.2	.88	.93844	314.7	44.9	.83
167	.97644	330.3	61.3	.89	.95072	320.1	49.2	.89	.94381	315.7	36.4	.89
168	.96855	326.4	86.2	.94	.94690	320.4	58.2	.77	.93785	313.5	41.3	.74
169	.96508	325.3	87.8	.93	.94174	319.2	62.1	.77	.93070	311.5	44.5	.76
170	.96863	329.9	94.4	.95	.94587	321.2	68.2	.96	.94882	317.8	37.8	.71
171	.96777	326.6	87.4	.97	.95044	320.5	53.5	.76	.94727	316.2	35.7	.64
172	.96190	327.5	93.8	.97	.94220	321.2	66.8	.86	.93608	313.6	44.9	.74
173	.96221	328.4	81.5	.89	.93916	320.1	65.6	.88	.92571	310.2	48.0	.82
174	.96479	325.6	90.5	.88	.93402	319.6	74.8	.91	.92556	311.1	52.7	.85
175	.96457	326.2	99.1	.93	.93446	318.5	8C.7	.94	.92688	312.4	57.8	.79
176	.97892	333.6	97.2	1.01	.95441	322.4	49.4	.91	.95566	317.1	23.7	.97
177	.96190	328.5	102.5	1.05	.94117	318.7	52.9	.90	.94432	313.8	26.6	.80
180	.97565	333.2	92.7	.90	.93984	323.4	58.2	.75	.93733	316.2	38.0	.80
181	.97445	333.5	73.1	.90	.94233	319.8	46.8	.86	.95088	319.8	25.5	.64
182	.96757	327.8	72.1	.90	.94028	322.9	55.0	.85	.92871	312.7	38.6	.78
183	.96013	329.6	105.2	.95	.93262	324.2	72.1	.82	.92710	314.5	48.0	.81
184	.97147	338.0	145.7	1.47	.95206	331.0	95.0	1.40	.94358	320.2	50.5	1.25
185	.97005	335.5	129.1	1.58	.94322	329.6	86.0	1.70	.93005	315.4	50.9	1.58
186	.96564	333.6	95.2	1.10	.94661	324.7	56.4	.92	.94558	317.2	30.2	.78
187	.96351	334.9	142.2	1.23	.92983	325.7	87.4	1.16	.92395	313.6	55.8	1.23
200	.95364	328.5	128.7		.93070	317.7	70.1		.92585	309.8	33.3	
201	.95541	322.9	91.3		.93630	314.6	48.4		.93337	310.4	23.5	
202	.94353	323.3	147.7		.91540	312.8	91.7		.90974	305.2	47.4	
203	.93865	322.0	152.0		.90650	310.9	99.7		.89863	305.2	60.7	
204	.94198	320.0	102.8		.91488	309.2	56.6		.91173	304.1	28.2	
205	.95851	321.7	69.5		.93755	313.6	37.2		.93616	310.0	17.2	
206	.93091	313.6	79.1		.90349	302.2	36.6		.90002	297.7	16.8	
207	.93865	315.1	73.9		.91533	305.2	31.5		.91533	302.1	12.1	
208	.95857	319.6	46.4		.93916	311.7	20.4		.94058	309.9	7.6	
209	.93253	314.3	87.6		.90937	304.9	44.5		.91394	304.6	22.3	
210	.94014	316.1	71.1		.91953	307.6	35.7		.92475	305.6	15.5	
211	.95851	319.1	41.9		.94102	312.4	19.2		.94432	311.2	8.0	
212	.93490	315.4	82.5		.91304	306.1	40.4		.91827	303.7	17.2	
213	.94132	315.9	69.7		.92159	307.8	33.1		.92659	306.1	13.7	
214	.94862	315.6	36.2		.93704	310.9	14.9		.93925	309.6	5.3	
215	.93238	309.2	37.0		.91864	303.8	13.9		.92850	305.1	3.1	
216	.94242	313.1	36.8		.92836	307.2	14.1		.93549	307.9	5.3	
217	.95252	316.4	33.3		.94058	311.2	11.6		.94624	311.4	3.5	
218	.95143	316.6	47.2		.94270	312.2	17.2		.95418	313.7	3.3	
219	.95261	318.4	52.3		.94506	313.1	15.7		.95529	314.3	3.1	
220	.95379	318.7	52.9		.94028	312.1	19.4		.95088	313.2	7.6	

[a] h measured in J/m²-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Continued

(c) *Configuration* 19; $P_2 + R_2 + M_2$

Thermocouple	M = 2.49; T_t = 402° K; p_t = 155 467 N/m^2				M = 3.51; T_t = 396° K; p_t = 257 356 N/m^2				M = 4.44; T_t = 378° K; p_t = 416 989 N/m^2			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.97285	328.0	45.1	.96	.96194	319.7	24.5	.97	.94269	317.1	15.5	1.04
2	.97566	329.4	47.2	.96	.96357	320.1	22.9	.96	.94420	317.2	12.9	1.02
3	.97853	330.2	46.4	.96	.96739	321.3	22.1	.94	.94872	318.5	11.8	.98
4	.97847	329.9	44.5	.98	.96866	321.7	21.9	.95	.95131	319.2	10.6	.96
5	.97818	330.0	46.6	.99	.96859	321.7	22.9	.95	.95200	319.6	11.6	.97
6	.97797	330.1	48.0	.98	.96852	321.7	23.3	.96	.95270	319.9	12.1	1.05
7	.97748	329.7	47.0	1.00	.96830	321.7	22.3	.96	.95311	320.0	11.6	.95
8	.97735	329.6	46.2	.98	.96810	321.6	22.5	.94	.95346	320.1	11.2	.98
9	.97706	329.6	47.2	.98	.96810	321.7	22.9	.95	.95387	320.2	11.2	.98
10	.97902	330.4	46.8	.99	.97007	322.1	22.9	.97	.95526	320.6	11.0	.87
11	.98000	329.0	30.8	.67	.97106	321.0	17.6	.75	.95576	320.2	8.2	.70
12	.98218	327.1	14.7	.31	.97396	320.9	8.2	.34	.95770	320.4	3.9	.34
13	.98759	328.2	7.8	.16	.97955	322.3	2.9	.11	.96222	321.6	1.2	.10
14	.99257	330.1	8.0		.95614	323.7	65.8					
44	.99404	330.0	1.2	.03								
45	.98730	328.4	6.7	.15								
46	.97979	328.3	26.8	.60	.97750	323.5	13.5	.69	.95305	319.2	5.5	.57
47	.97776	327.9	29.6	.61	.97573	323.9	22.5	1.18	.95144	319.0	9.4	1.00
48	.97678	327.9	32.3	.60	.97679	325.7	27.2	1.00	.95324	319.9	11.4	1.17
49	.97678	328.2	34.7	.61	.97730	325.4	28.6	1.03	.95533	320.8	12.3	.88
50	.98015	329.5	36.4	.59	.97617	325.4	30.0	1.07	.95652	321.6	15.3	.97
51	.99151	334.4	33.5	.60	.98112	327.1	25.3	1.02	.96118	323.2	14.3	1.04
54	.97496	329.1	46.4	.96	.96273	319.9	23.1	.97	.94321	317.1	13.3	.97
55	.97783	330.1	47.4	.98	.96817	321.8	23.9	.95	.95235	319.9	12.9	.97
56	.97735	329.8	46.4	1.00	.96724	321.6	24.7	.95	.95159	319.7	13.1	.93
57	.97776	329.7	44.3	.97	.96781	321.7	24.3	.95	.95131	319.6	13.3	.96
58	.97832	329.9	44.5	.97	.96768	321.8	27.2	1.00	.95033	319.4	14.1	.95
59	.97902	330.4	44.7	.96	.96795	322.8	26.8	.98	.94894	319.1	15.5	1.06
60	.97972	330.6	45.8	.98	.96881	323.0	26.6	.98	.94594	318.1	16.5	1.07
61	.97656	329.7	47.0	.98	.96823	321.8	24.1	.98	.95450	320.6	13.1	1.02
62	.97579	329.2	46.0	.98	.96711	321.4	23.9	.95	.95359	320.3	12.5	.91
63	.97656	329.5	45.4	.98	.96788	321.9	25.1	.97	.95374	320.5	13.7	.99
64	.97748	329.7	44.3	.94	.96775	321.9	26.4	.96	.95144	319.9	14.5	.89
65	.97628	329.4	45.4	.96	.96759	322.3	24.9	1.00	.95444	320.6	12.9	.97
66	.97706	329.5	46.0	.99	.96781	322.6	27.8	1.03	.95172	319.9	15.3	1.01
67	.97930	331.2	52.9	1.11	.96987	323.7	29.8	1.21	.95568	321.4	15.9	1.32
68	.97691	329.7	46.6	.99	.96795	321.7	24.3	.98	.95470	320.6	12.5	.90
69	.97551	329.1	43.9	.97	.96711	321.5	23.7	.96	.95318	320.2	13.1	1.03
70	.97573	329.0	43.9	.96	.96647	321.4	25.5	.95	.95200	319.9	13.7	.92
71	.97735	329.6	44.7	.98	.96759	321.9	27.8	1.01	.95213	320.0	14.9	1.00
72	.97818	329.7	43.5	.98	.96839	322.0	25.5	.97	.95116	319.6	14.9	.95
73	.97726	330.1	50.0	1.03	.96753	322.0	27.4	1.00	.94859	318.9	16.1	1.00
74	.97481	329.1	47.6	1.03	.96653	321.4	25.5	1.05	.95422	320.5	13.9	1.19
75	.97706	329.5	44.7	.98	.96731	321.7	25.1	.95	.95200	319.9	14.9	1.04
76	.98239	333.0	59.6	1.29	.97184	324.0	31.3	1.37	.95437	321.1	17.2	1.47
77	.97656	330.0	50.5	1.08	.96605	321.5	26.8	1.10	.95305	320.4	14.7	1.24
78	.97650	329.1	42.7	.98	.96682	321.3	24.1	.95	.95144	319.6	14.3	1.09
79	.97755	330.7	53.9	1.21	.96611	321.9	30.0	1.28	.95179	320.1	15.3	1.21
80	.97665	329.2	43.5	.98	.96711	321.4	25.7	1.02	.95200	319.8	13.5	.94
81	.97768	331.4	58.4	1.27	.96626	322.5	36.0	1.53	.95011	319.9	18.8	1.59
82	.97665	329.3	43.9	.98	.96682	321.3	24.1	.97	.95159	319.7	13.7	.99
83	.99158	334.4	43.9	.95	.98386	327.6	22.9	.99	.96472	324.2	12.1	1.04
84	.97902	332.0	59.4	1.30	.96768	323.1	34.7	1.48	.95020	320.1	20.8	1.73
85	.97594	330.2	52.9	1.19	.96399	321.1	29.2	1.25	.94977	319.4	17.0	1.32
86	.97636	329.6	47.8	1.10	.96611	321.2	24.7	1.03	.95179	319.7	13.1	1.00
87	.97628	329.2	44.9	1.02	.96640	321.0	24.5	1.00	.95102	319.4	13.9	1.00
88	.97678	329.2	42.9	.99	.96724	321.3	24.7	1.02	.94991	319.1	13.7	.99
89	.97706	329.5	43.9	.98	.96759	321.5	23.7	.90	.94852	318.6	14.9	1.06
90	.97665	329.6	49.0	1.04	.96697	321.4	23.9	.95	.94755	318.4	15.1	1.04
91	.97327	329.1	52.1	1.13	.96406	321.4	30.4	1.32	.94720	318.7	18.4	1.53
92	.97706	330.2	53.9	1.22	.96711	321.7	25.7	1.04	.95185	319.8	14.7	1.06
94	.96884	327.1	48.2	1.08	.96131	319.6	24.9	1.13	.94448	317.2	12.7	1.11
95	.97088	327.9	49.0	1.10	.96081	320.0	28.8	1.27	.94413	317.5	15.9	1.34
96	.97509	329.7	53.9	1.23	.96414	322.5	34.1	1.44	.94559	318.4	20.8	1.65
97	.97411	327.7	39.4	1.25	.96505	320.6	24.1	1.34	.94748	318.4	13.5	1.50
98	.97665	330.3	55.6	1.23	.96689	321.7	26.4	1.10	.94894	319.0	15.5	1.15
99	.97691	331.4	50.0	1.12	.96753	321.5	23.5	.99	.94748	318.4	14.9	1.01
100	.97608	329.5	47.0	1.02	.96605	321.0	23.1	.95	.94602	317.9	15.1	.99
102	.97467	329.2	49.0	1.11	.96640	322.2	33.5	1.44	.94768	319.0	19.2	1.42
103	.98035	329.1	30.4	.66	.97058	320.6	10.0	.44	.94852	317.2	1.0	.10
104	.97130	328.4	54.7	1.22	.95636	317.5	21.9	1.02	.93915	315.3	13.1	1.21
105	.97025	327.9	50.3	1.13	.96158	319.7	25.5	1.16	.94761	318.3	13.9	1.24
106	.97187	328.0	46.8	1.06	.96626	321.7	28.0	1.22	.94950	319.4	17.4	1.42
107	.97614	329.9	53.3	1.20	.96633	323.4	28.6	1.25	.94524	317.9	18.2	1.33
108	.96696	325.0	35.5	.81	.95400	315.8	16.5	.82	.92499	310.0	9.4	.96
109	.97229	328.0	46.4	1.10	.96569	321.1	26.6	1.17	.95081	319.5	14.9	1.22
110	.97130	326.9	38.2	.72	.96866	323.7	37.4	1.45	.95089	320.4	23.1	1.74
111	.97825	332.2	51.7	1.01	.97234	324.8	30.6	1.11	.95444	321.4	19.2	1.42
112	.98296	334.4	54.7	1.09	.97608	326.0	29.6	1.12	.96229	324.0	18.0	1.13
113	.98568	334.4	49.0	1.00	.97714	326.0	32.9	1.31	.96133	323.7	18.4	1.08
114	.98393	332.7	53.7	1.05	.97659	326.2	36.8	1.44	.96063	323.9	22.1	1.24
115	.98513	332.8	50.5	1.04	.97701	326.3	35.7	1.34	.95985	323.7	23.3	1.23
116	.98568	333.0	50.0	1.03	.97878	327.1	36.2	1.30	.95854	323.5	24.7	1.29
117	.97706	330.0	49.2	.96	.96839	321.7	22.9	.94	.95150	319.4	10.4	1.02
118	.97586	329.8	49.6	1.00	.96859	321.9	22.3	.92	.95387	320.0	8.0	.85
119	.97538	329.5	50.0	.98	.96810	321.6	22.7	.94	.95394	320.1	9.8	1.00
120	.97503	329.6	50.9	1.00	.96724	321.2	21.9	.94	.95290	319.6	8.6	.95
121	.97544	329.8	51.7	1.01	.96781	321.4	22.1	.97	.95339	319.8	8.8	1.13
122	.97046	328.0	52.3	1.06	.96328	320.0	22.9	1.06	.94811	318.1	10.0	1.32
123	.96814	327.4	53.9	1.11	.96286	319.8	22.3	1.06	.95020	318.7	8.4	1.08
130	.97524	331.4	44.9	.97	.96386	321.8	23.9	.93	.94824	319.2	13.9	.97

[a] h measured in J/m^2-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Continued

(c) Configuration 19; $P_2 + R_2 + M_2$ - Concluded

Thermocouple	M = 2.49; T_t = 402° K; p_t = 155 467 N/m²				M = 3.51; T_t = 396° K; p_t = 257 356 N/m²				M = 4.44; T_t = 378° K; p_t = 416 989 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
131	.96246	329.7	65.8	1.12	.94592	317.9	36.0	1.07	.93011	314.0	21.4	1.28
132	.96814	330.2	55.8	.98	.95863	321.5	32.9	.95	.94539	319.1	19.0	1.03
133	.97509	327.3	21.7	.55	.96987	321.7	13.5	.71	.95561	320.7	7.4	.69
134	.97250	330.1	43.5	.91	.95525	319.6	27.0	.92	.93547	315.5	17.2	1.01
135	.97314	329.4	37.4	.96	.95533	315.6	7.4	.36				
136	.97446	333.8	66.8	1.06	.96364	325.1	29.8	.92	.94811	319.5	15.5	1.00
137	.97474	330.7	43.9	1.08	.96187	320.5	20.6	1.01	.94685	318.4	10.6	1.16
138	1.00000	333.7	2.9	.06	.98698	324.8	1.2	.04				
150	1.00000	342.0	62.7	.69	1.00000	336.6	47.4	.93	.98768	335.6	33.9	1.11
151	1.00000	342.1	67.4	.73	1.00000	335.3	46.0	.83	.98246	332.1	32.7	1.03
152	1.00000	347.1	90.7	.98	.99781	333.6	40.0	.71	.97733	329.7	25.9	.72
153	1.00000	343.0	87.2	.93	.99872	334.1	38.4	.61	.97524	330.2	27.6	.70
154	.99901	341.7	90.9	.96	.99392	333.7	47.4	.71	.96550	326.4	29.0	.68
155	.99678	341.4	96.6	.99	.98733	332.4	55.2	.78	.95548	324.9	36.0	.76
156	.99509	341.5	103.6	1.01	.98154	334.1	60.3	.85	.94929	321.5	39.0	.77
157	.99375	340.2	93.2	1.02	.98013	329.9	55.0	.82	.94881	321.7	34.5	.77
158	.99257	338.9	84.6	.93	.96746	325.1	43.5	.79	.94483	319.9	29.8	.88
159	.99572	342.9	88.5	.99	.98450	333.9	52.5	.85	.95881	326.0	34.5	.88
160	.99516	340.7	92.7	1.01	.97617	329.1	61.1	.94	.94733	322.2	49.4	1.11
161	.99312	340.4	96.4	1.09	.97517	329.7	69.0	1.08	.94783	323.1	57.8	1.18
162	.97180	332.4	91.9	.98	.96759	328.6	66.8	1.02	.93047	314.6	36.6	.90
163	.97636	336.2	86.4	.99	.96039	322.9	50.7	.82	.93584	317.1	36.2	.81
164	.98548	336.6	86.2	.96	.96450	324.6	57.4	.84	.93865	318.2	40.2	.80
165	.98801	337.9	90.3	.99	.96244	324.3	61.3	.87	.93410	317.5	47.4	.88
166	.98794	338.2	94.2	.96	.96229	324.8	65.8	.86	.93337	318.2	57.2	1.05
167	.99193	336.7	65.4	.95	.97206	326.4	50.9	.92	.94248	320.3	44.1	1.07
168	.98498	336.9	90.5	.98	.95724	323.1	65.4	.87	.92933	316.3	51.5	.93
169	.98099	335.6	91.1	.97	.95195	323.4	65.8	.81	.92302	314.6	56.4	.97
170	.96505	331.7	107.5	1.08	.95378	324.6	70.3	.99	.93040	316.5	51.9	.97
171	.96654	333.5	93.8	1.04	.95099	320.7	58.4	.83	.92606	315.0	46.0	.83
172	.97426	333.5	93.6	.97	.95452	325.6	63.3	.81	.92237	314.0	53.1	.88
173	.97783	334.1	87.8	.96	.94996	321.2	69.0	.92	.91855	313.2	58.2	.99
174	.97923	335.4	95.4	.92	.94775	321.1	75.0	.91	.92143	315.1	67.0	1.08
175	.97691	334.7	96.8	.91	.95048	322.4	78.4	.92	.92065	315.3	72.5	.99
176	.99283	340.4	101.3	1.05	.97644	330.2	57.6	1.06	.94887	321.0	33.9	1.38
177	.98323	337.4	103.6	1.07	.96350	326.6	62.7	1.07	.94177	319.1	38.6	1.16
180	.97748	339.2	96.0	.93	.96611	330.7	71.5	.92	.92845	316.9	42.5	.89
181	.98520	340.6	66.6	.82	.97106	328.3	46.6	.86	.93859	320.5	30.2	.76
182	.97685	337.6	85.6	1.07	.95025	325.5	58.6	.91	.91421	313.0	47.8	.97
183	.97117	338.4	104.2	.94	.94666	325.1	77.6	.88	.91253	313.6	57.0	.96
184	.99516	343.6	85.2	.86	.99109	340.1	63.1	.93	.96731	329.7	30.6	.76
185	.99250	346.4	85.4	1.05	.98946	340.7	56.8	1.13	.95548	323.6	28.4	.88
186	.99704	348.0	86.6	1.00	.98861	333.6	42.5	.69	.96202	327.2	35.5	.92
187	.98926	346.2	119.3	1.03	.97659	333.8	72.9	.97	.94755	323.9	47.0	1.04
300	.96148	333.0	127.1		.94098	318.9	72.5		.91528	310.8	43.3	
301	.96485	331.0	87.0		.94636	317.7	44.9		.92050	312.4	28.6	
302	.95481	331.0	133.4		.92849	315.9	85.6		.90082	310.7	64.8	
303	.94763	329.4	143.2		.91885	313.7	103.6		.89171	307.4	70.7	
304	.95314	327.8	110.5		.92796	312.5	62.7		.90407	307.7	40.4	
305	.97193	330.6	65.8		.95254	318.2	33.9		.92744	312.6	19.2	
306	.93755	320.0	79.7		.91083	304.4	37.6		.88628	298.8	22.9	
307	.94916	322.9	67.4		.92510	308.5	31.1		.90293	303.7	16.5	
308	.96772	326.6	46.8		.94791	314.6	20.8		.92491	310.5	11.2	
309	.94063	322.4	88.7		.91665	307.7	48.0		.89930	304.9	27.8	
310	.95216	323.7	63.5		.93246	311.3	32.7		.91464	308.5	18.8	
311	.97053	327.3	44.7		.95562	316.9	19.6		.93481	313.7	9.8	
312	.94683	324.0	88.9		.92657	310.5	46.8		.91088	308.3	26.4	
313	.97340	328.6	47.0		.96045	318.6	19.2		.93902	315.0	10.0	
315	.97972	328.4	27.8		.97007	320.5	11.2					
316	.98218	328.9	23.3		.97396	322.0	12.3		.95200	319.1	7.1	
317	.98450	330.0	31.3		.97263	321.6	14.1		.95270	319.3	9.6	

[a] h measured in J/m²-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - *Continued*

(d) Configuration 20; $P_2 + R_2 + M_2$ reversed

Thermocouple	M = 2.49; T_t = 395° K; p_t = 155 659 N/m²				M = 3.51; T_t = 397° K; p_t = 259 367 N/m²				M = 4.44; T_t = 380° K; p_t = 417 899 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.96018	318.5	46.0	.97	.94890	314.4	25.5	1.01	.94192	313.6	14.5	.97
2	.96331	319.9	47.4	.96	.95090	314.7	23.5	.98	.94381	313.9	12.9	1.02
3	.96589	320.6	47.0	.97	.95497	316.0	22.5	.96	.94915	315.4	11.0	.92
4	.96598	320.4	44.9	.99	.95653	316.5	22.5	.97	.95185	316.2	10.8	.98
5	.96569	320.5	47.2	1.00	.95675	316.6	23.1	.96	.95280	316.6	11.2	.93
6	.96583	320.7	48.0	.98	.95682	316.7	23.1	.95	.95354	316.9	11.4	1.00
7	.96523	320.4	46.6	.99	.95697	316.7	22.7	.97	.95441	317.1	10.4	.85
8	.96523	320.3	46.8	.99	.95719	316.7	22.7	.95	.95520	317.3	10.6	.93
9	.96724	321.0	46.8	.97	.95926	317.4	23.7	.98	.95773	318.1	10.0	.88
10	.97351	324.8	60.9	1.29	.96630	321.5	30.0	1.27	.96300	320.7	15.3	1.21
46	.94786	315.6	56.8	1.28	.94038	311.9	28.4	1.46	.94029	312.6	14.3	1.49
47	.94430	315.1	62.5	1.28	.93535	310.4	28.6	1.51	.93547	311.0	14.5	1.54
48	.94957	317.8	70.7	1.31	.93794	311.1	27.8	1.02	.93679	311.2	12.9	1.31
49	.95648	321.0	78.2	1.38	.94186	313.5	33.7	1.21	.94038	312.8	14.5	1.04
50	.96300	323.6	84.2	1.37	.94498	315.0	36.6	1.30	.94279	314.4	19.4	1.23
51	.97253	329.7	71.9	1.28	.95431	317.8	32.3	1.30	.95172	317.1	16.3	1.19
54	.96241	319.6	47.0	.97	.95000	314.6	23.9	1.00	.94279	313.7	13.3	.97
55	.96532	320.5	47.6	.98	.95668	316.9	24.3	.97	.95324	316.9	12.3	.92
56	.96479	320.1	45.6	.98	.95594	316.7	24.7	.95	.95259	316.8	12.9	.91
57	.96516	320.1	43.7	.96	.95682	316.9	24.5	.96	.95252	316.8	12.9	.93
58	.96494	320.0	43.9	.96	.95697	317.1	25.7	.95	.95185	316.7	14.3	.96
59	.96627	320.7	45.4	.97	.95763	318.2	26.8	.98	.95061	316.5	14.7	1.00
60	.96642	320.7	46.2	.99	.95904	317.9	26.8	.99	.94805	315.7	16.1	1.04
61	.96843	321.4	47.4	.99	.95985	318.4	23.1	.93	.95821	318.5	11.0	.86
62	.96419	319.9	45.4	.97	.95689	316.9	24.3	.97	.95547	317.6	11.6	.85
63	.96442	320.0	45.1	.98	.95748	317.9	25.3	.98	.95555	317.8	12.9	.93
64	.96510	320.2	45.4	.97	.95838	317.6	27.8	1.01	.95404	317.5	13.1	.80
65	.96902	322.0	50.5	1.07	.96016	318.0	23.9	.96	.95857	318.6	11.6	.88
66	.96479	320.1	45.1	.97	.95831	317.7	26.4	.98	.95463	317.6	14.3	.95
67	.97688	327.9	84.6	1.77	.96630	324.1	48.8	1.98	.95821	321.0	28.6	2.37
68	.96776	322.7	60.5	1.29	.95534	318.2	34.5	1.39	.95575	318.8	18.2	1.31
69	.96768	321.5	48.4	1.07	.95919	318.3	24.1	.98	.95667	318.1	11.6	.92
70	.96426	319.9	44.5	.98	.95726	317.2	24.9	.93	.95476	317.6	12.3	.82
71	.96516	320.2	45.4	.99	.95867	317.8	25.5	.93	.95498	317.7	13.5	.90
72	.96569	320.3	44.9	1.01	.95979	318.0	24.7	.94	.95404	317.5	13.7	.87
73	.96479	320.5	48.6	1.00	.95926	318.7	25.7	.94	.95157	316.7	14.7	.91
74	.96909	324.8	79.3	1.71	.95697	321.0	49.6	2.04	.94820	317.8	28.4	2.44
75	.96523	320.2	45.6	1.00	.95867	317.6	26.6	1.00	.95498	317.6	13.5	.94
76	.98752	322.9	5.7	.12	.97943	320.4	2.9	.13				
77	.96331	322.7	73.7	1.58	.95275	319.4	48.2	1.98	.94470	316.6	30.2	2.55
78	.96732	321.0	45.8	1.05	.95875	317.4	26.1	1.03	.95476	317.5	12.9	.98
79	.95277	317.4	56.8	1.28	.94364	314.0	32.9	1.40	.93862	313.0	18.6	1.47
80	.96673	321.5	52.5	1.18	.96038	318.0	24.1	.95	.95590	317.8	12.1	.84
81	.95054	316.7	58.6	1.28	.93898	312.0	30.4	1.30	.93343	310.9	16.1	1.36
82	.96479	321.5	57.8	1.29	.95741	318.0	29.6	1.19	.95505	317.8	12.9	.93
84	.94986	316.5	58.8	1.29	.93801	311.8	31.5	1.34	.93167	310.2	17.2	1.42
85	.95350	317.4	55.2	1.24	.94430	313.9	31.7	1.36	.93788	312.5	17.6	1.37
86	.96034	320.0	58.0	1.33	.94971	317.6	37.4	1.56	.94075	314.4	22.3	1.70
87	.96464	321.7	59.9	1.36	.95312	317.4	33.5	1.37	.94959	316.6	17.6	1.26
88	.96516	321.0	53.5	1.24	.96008	318.1	24.1	.99	.95383	317.2	13.1	.94
89	.96664	321.1	49.0	1.10	.95985	317.7	24.1	.91	.95215	316.6	12.9	.91
90	.96494	320.4	47.4	1.01	.95926	317.6	24.9	.99	.95128	316.4	13.9	.96
91	.95173	317.0	55.2	1.19	.94342	313.4	31.3	1.35	.93773	312.2	17.0	1.41
92	.96278	320.4	53.1	1.20	.95668	319.4	34.1	1.38	.94805	316.3	20.4	1.47
94	.95068	315.5	46.2	1.04	.94468	312.9	24.3	1.10	.94133	313.2	13.5	1.18
95	.95581	317.9	52.3	1.17	.94800	314.5	27.8	1.23	.94594	314.4	12.9	1.09
96	.95796	318.4	49.8	1.13	.95268	316.0	27.2	1.15	.94966	315.9	13.5	1.06
97	.95862	316.8	36.4	1.15	.95801	316.6	24.1	1.34	.95128	316.3	13.5	1.50
98	.96316	320.4	55.0	1.21	.95904	319.0	33.9	1.42	.94863	316.4	19.0	1.41
99	.96569	322.9	56.6	1.26	.95785	318.2	31.1	1.31	.94863	316.0	16.8	1.14
100	.96397	320.9	55.8	1.21	.95831	317.6	25.5	1.05	.95024	316.1	13.5	.88
102	.95848	318.4	48.8	1.10	.95638	317.2	27.2	1.17	.95274	317.0	14.9	1.11
103	.93672	311.5	51.7	1.11	.93513	308.2	15.5	.68	.93877	311.1	5.5	.54
104	.94920	314.9	45.6	1.01	.94630	312.3	18.8	.88	.94631	314.1	9.2	.85
105	.95454	316.6	44.1	1.00	.95046	314.2	23.3	1.06	.94733	314.7	10.8	.96
106	.95826	318.2	47.6	1.07	.95578	318.1	25.9	1.13	.95289	316.9	13.9	1.13
107	.96071	319.0	47.4	1.07	.96016	319.4	28.2	1.23	.95018	316.6	17.8	1.30
108	.94979	317.5	67.6	1.53	.94023	311.4	26.1	1.29	.93510	310.5	11.0	1.13
109	.96011	318.4	43.7	1.04	.95609	316.6	24.7	1.09	.95324	316.9	12.9	1.05
110	.98123	334.5	83.6	1.59	.97571	328.4	51.7	2.01	.96054	321.7	26.8	2.02
111	.97423	329.6	68.2	1.33	.97001	321.7	26.4	.96	.96729	321.9	13.1	.97
112	.97480	324.4	54.5	1.09	.96482	320.9	30.4	1.15	.95780	319.2	17.6	1.10
113	.98130	326.5	53.7	1.09	.96401	319.7	26.6	1.06	.96223	321.2	18.8	1.11
114	.97451	325.1	62.9	1.23	.96571	322.4	32.9	1.29	.96377	321.9	19.2	1.08
115	.97295	323.9	52.1	1.08	.96888	323.4	31.5	1.18	.96125	321.0	19.8	1.04
116	.97451	327.4	46.2	.95	.96930	322.6	29.4	1.06	.96083	320.9	19.4	1.01
117	.96532	320.9	50.3	.98	.95668	316.7	22.9	.94	.95230	316.3	10.4	1.02
118	.96472	320.7	49.6	1.00	.95794	317.1	24.1	1.00	.95527	317.2	9.4	1.00
119	.96850	322.3	54.1	1.06	.96008	317.7	23.5	.97	.95773	317.9	8.6	.88
120	.96532	322.5	64.8	1.27	.95911	318.4	29.2	1.25	.95632	317.9	11.8	1.32
121	.96331	322.0	66.8	1.31	.95490	317.2	31.5	1.39	.95098	316.4	13.5	1.74
122	.95522	318.1	56.4	1.15	.95134	315.0	24.5	1.13	.95178	315.8	9.2	1.22
123	.95870	318.9	52.5	1.08	.95193	315.0	24.3	1.16	.95054	315.3	8.2	1.05
130	.96589	328.7	47.6	1.03	.95387	317.8	24.3	.94	.95083	317.1	14.5	1.01
131	.94891	318.2	55.2	.94	.94083	314.6	30.2	.90	.94001	313.9	16.5	.99
132	.95387	320.8	61.3	1.08	.93350	314.0	38.2	1.10	.92018	308.4	22.3	1.21
133	.93555	307.9	16.5	.42	.93535	307.9	9.8	.52	.93299	309.0	3.9	.37
134	.95410	319.0	45.1	.94	.94853	316.1	24.5	.83	.94813	316.2	13.7	.81
135	.94327	314.1	37.0	.95	.93713	309.4	12.5	.61	.94001	311.7	5.7	.55
136	.95573	328.3	70.9	1.13	.94490	318.5	38.0	1.18	.94490	316.8	21.0	1.36
137	.97752	329.6	50.9	1.25	.96716	322.0	20.8	1.02	.95815	319.3	10.6	1.16

[a] h measured in J/m²-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Continued

(d) Configuration 20; $P_2 + R_2 + M2$ reversed - Concluded

Thermocouple	M = 2.49; T_t = 395° K; p_t = 155 659 N/m^2				M = 3.51; T_t = 397° K; p_t = 259 367 N/m^2				M = 4.44; T_t = 380° K; p_t = 417 899 N/m^2			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
150	.98458	332.2	95.4	1.06	.96401	323.6	48.8	.96	.95435	319.5	27.4	.90
151	.97967	330.7	98.1	1.06	.95785	321.9	50.0	.90	.94681	317.3	30.0	.94
152	.97208	328.5	100.3	1.08	.95222	320.7	52.7	.93	.93986	315.5	33.9	.94
153	.96776	327.4	104.6	1.11	.94824	319.7	55.2	.87	.93562	314.4	37.2	.94
154	.96486	326.7	107.5	1.13	.94505	318.8	59.9	.90	.93225	314.2	39.8	.94
155	.96287	326.5	111.5	1.14	.94186	318.1	62.9	.89	.92932	313.6	41.1	.87
156	.96249	334.4	114.6	1.12	.94098	318.5	66.2	.93	.92860	312.9	43.1	.85
157	.96272	326.1	107.2	1.17	.94201	317.9	60.3	.90	.93065	314.0	39.6	.88
158	.99237	334.4	93.4	1.03	.98014	329.5	50.3	.92	.97116	326.9	33.9	1.00
159	.97994	329.1	82.5	.92	.97244	327.5	48.6	.79	.96434	323.0	27.6	.70
160	.98344	329.4	75.6	.82	.96910	327.2	52.3	.80	.94929	320.2	42.3	.95
161	.98380	334.7	82.7	.93	.96586	325.9	61.5	.96	.94396	319.6	51.7	1.06
162	.98030	330.0	89.5	.96	.96615	325.2	53.3	.82	.95562	322.2	38.8	.95
163	.97895	329.8	88.7	1.02	.96688	324.4	49.6	.80	.96026	321.7	29.6	.67
164	.97009	325.6	81.3	.90	.95726	322.0	51.7	.76	.94140	316.4	36.0	.72
165	.96952	325.5	80.3	.88	.94897	320.9	56.2	.79	.93686	315.2	39.2	.72
166	.97023	325.4	77.6	.79	.94859	320.0	61.5	.80	.93174	315.2	50.7	.93
167	.97938	326.4	60.3	.87	.95935	321.3	45.8	.83	.94212	317.7	39.8	.97
168	.96761	324.9	81.1	.88	.94608	319.1	61.3	.82	.92743	312.7	43.7	.79
169	.96464	324.0	81.3	.86	.94556	319.4	64.8	.80	.91835	310.4	50.3	.86
170	.96994	326.9	92.1	.92	.95372	322.3	59.6	.84	.94212	317.9	44.1	.83
171	.97137	326.9	88.7	.98	.95282	320.4	51.5	.73	.94075	316.3	38.6	.69
172	.96071	323.3	87.6	.91	.94978	320.7	62.9	.81	.93401	315.5	47.8	.79
173	.96331	323.4	77.6	.85	.94556	321.0	62.1	.83	.91514	309.8	53.1	.91
174	.96249	323.8	86.2	.83	.93689	319.7	71.9	.87	.91353	310.0	58.8	.94
175	.96494	325.1	95.4	.89	.93689	319.9	71.9	.84	.92172	313.6	63.7	.87
176	.98152	330.3	88.9	.92	.97600	328.2	51.5	.95	.96187	322.7	32.7	1.33
177	.97052	326.5	88.0	.91	.95985	322.9	54.7	.93	.95128	319.3	33.5	1.01
180	.97224	334.1	87.8	.85	.95378	326.1	61.1	.78	.93921	319.4	42.3	.89
181	.97266	334.6	73.7	.90	.95372	324.2	43.5	.80	.94257	317.7	29.8	.75
182	.96746	329.7	71.3	.89	.94074	322.0	52.7	.81	.92209	313.0	40.9	.83
183	.96049	333.8	91.9	.83	.93653	324.5	67.0	.76	.91857	313.9	51.3	.86
184	.96190	340.9	111.5	1.13	.93394	322.4	74.2	1.09	.92274	313.6	46.0	1.14
185	.96865	332.1	110.5	1.35	.94868	326.7	72.1	1.43	.93328	317.3	41.1	1.27
186	.96153	337.4	94.0	1.08	.93616	320.5	52.5	.85	.92296	312.0	35.3	.91
187	.95678	332.2	140.5	1.21	.93185	322.4	78.6	1.05	.91866	312.6	48.0	1.06
300	.93153	310.9	59.6		.92142	305.3	24.5		.92750	308.2	12.1	
301	.93718	310.9	41.5		.93016	306.5	15.3		.93256	309.0	6.3	
302	.93279	309.6	50.5		.92483	305.6	21.4		.92896	307.9	6.7	
303	.92358	305.2	38.6		.90609	298.0	14.3		.90608	300.0	5.1	
304	.93072	308.4	45.4		.92039	303.5	18.8		.91770	304.4	8.8	
305	.93709	310.6	38.6		.93119	307.3	17.8		.92685	307.6	8.2	
306	.92344	311.5	93.6		.89690	300.7	48.4		.89137	298.7	25.7	
307	.93213	312.1	69.3		.91845	306.4	37.0		.91266	304.6	19.6	
308	.94289	314.4	54.3		.93379	310.4	29.2		.92676	308.7	15.1	
309	.91564	309.5	99.3		.88928	299.0	51.5		.88019	295.6	29.0	
310	.92909	311.9	74.4		.91432	306.1	40.4		.90541	303.2	22.9	
311	.94757	315.7	56.8		.93394	310.5	30.6		.92370	307.9	17.4	
312	.91482	306.2	76.8		.88506	295.7	46.8		.86811	291.3	30.2	
313	.94474	314.4	56.4		.92771	307.8	31.7		.91310	304.0	17.6	
315	.95454	323.6	116.0		.93372	317.5	83.1		.91266	308.8	56.6	
316	.95121	333.1	125.0		.92778	320.0	86.2		.90527	308.7	62.5	
317	.95722	334.7	166.1		.93000	319.7	106.6		.90797	310.5	76.8	

[a] h measured in J/m^2-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Continued

(e) Configuration 21; $P_2 + R_2 + M_3$

Thermocouple	M = 2.49; $T_t = 397^o$ K; p_t = 155 467 N/m^2				M = 3.51; $T_t = 390^o$ K; p_t = 257 261 N/m^2				M = 4.44; $T_t = 374^o$ K; p_t = 416 941 N/m^2			
	$\frac{T_e}{T_t}$	T_w, ^oK	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, ^oK	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, ^oK	h (a)	$\frac{h}{h_{(7)}}$
1	.96097	320.4	47.4	1.00	.93451	307.3	27.2	1.07	.93452	307.3	15.3	1.03
2	.96410	322.9	49.8	1.01	.93660	307.8	25.1	1.05	.93653	307.6	12.9	1.02
3	.96693	322.5	48.2	1.00	.94041	309.6	24.7	1.05	.94142	309.0	12.1	1.00
4	.96693	322.2	46.4	1.02	.94199	309.4	23.9	1.04	.94417	309.9	11.6	1.06
5	.96693	322.4	47.6	1.01	.94212	309.6	24.9	1.03	.94528	310.3	12.3	1.02
6	.96678	322.5	49.4	1.00	.94228	309.7	25.3	1.04	.94618	310.6	12.9	1.13
7	.96651	322.2	47.8	1.02	.94228	309.6	24.7	1.06	.94662	310.7	12.7	1.03
8	.96636	322.2	48.0	1.02	.94228	309.6	24.5	1.03	.94706	310.8	12.3	1.07
9	.96622	322.2	48.6	1.01	.94235	309.7	24.5	1.02	.94736	310.9	11.6	1.02
10	.96587	322.0	47.6	1.01	.94212	309.6	24.7	1.04	.94736	310.9	11.4	.90
46	.93498	317.6	88.2	1.98	.89020	294.0	35.3	1.82	.90293	296.5	15.3	1.60
47	.93640	315.9	90.3	1.85	.89349	295.1	34.9	1.84	.90375	296.7	15.3	1.63
48	.94000	319.7	90.9	1.69	.89857	297.2	37.0	1.36	.9C597	297.6	16.3	1.67
49	.94407	322.2	100.3	1.77	.90462	299.6	40.4	1.46	.90998	298.9	16.3	1.18
50	.94850	324.2	105.4	1.71	.91195	303.1	46.6	1.65	.91681	301.6	18.8	1.19
51	.95972	328.3	102.8	1.83	.92704	309.0	49.8	2.00	.92838	306.3	23.1	1.69
54	.96296	321.2	50.7	1.05	.93518	308.2	26.4	1.10	.93534	307.4	13.9	1.01
55	.96651	323.7	49.8	1.03	.94146	309.7	26.1	1.04	.94565	310.5	12.7	.95
56	.96607	323.4	48.8	1.05	.94055	309.5	26.6	1.02	.94514	310.5	13.5	.96
57	.96643	322.1	46.4	1.02	.94161	309.7	25.5	1.00	.94536	310.5	13.3	.96
58	.96665	322.2	46.4	1.01	.94212	310.1	26.8	.98	.94499	310.6	14.7	.99
59	.96714	322.6	47.2	1.01	.94272	310.5	27.8	1.01	.94395	310.4	15.1	1.03
60	.96778	322.7	46.8	1.00	.94348	310.6	28.2	1.05	.94173	309.7	16.8	1.08
61	.96558	322.1	48.8	1.02	.94206	309.8	25.5	1.03	.94803	311.3	12.7	.98
62	.96523	323.0	48.6	1.03	.94139	309.6	25.9	1.03	.94781	311.2	12.7	.93
63	.96594	323.2	48.0	1.04	.94272	310.2	26.8	1.03	.94869	311.6	13.5	.97
64	.96629	322.1	46.4	.99	.94332	310.7	28.2	1.02	.94736	311.4	14.5	.89
65	.96529	321.8	47.2	1.00	.94199	309.9	25.3	1.02	.94862	311.5	11.8	.89
66	.96622	323.4	47.4	1.02	.94348	310.7	29.4	1.09	.94772	311.5	14.1	.93
67	.96509	321.9	47.4	.99	.94219	309.7	25.1	1.02	.94847	311.4	11.6	.97
68	.96494	321.7	47.6	1.01	.94168	309.7	25.9	1.04	.94862	311.4	12.5	.90
69	.96523	321.7	48.4	1.07	.94235	310.0	25.9	1.05	.94825	311.4	13.1	1.03
70	.96509	321.6	46.0	1.01	.94243	310.7	27.0	1.01	.94765	311.3	13.3	.89
71	.96629	322.1	46.4	1.01	.94370	310.7	28.0	1.02	.94818	311.6	14.3	.96
72	.96707	322.2	45.1	1.02	.94437	310.9	27.4	1.04	.94750	311.4	14.9	.95
73	.96607	322.5	49.4	1.01	.94279	310.7	28.2	1.03	.94490	310.7	15.5	.96
74	.96438	322.6	47.4	1.02	.94183	309.5	24.5	1.01	.94840	311.3	11.8	1.02
75	.96607	322.0	48.8	1.07	.94363	310.5	27.2	1.02	.94818	311.6	14.5	1.01
77	.96529	323.0	48.0	1.03	.94235	309.7	25.7	1.06	.94928	311.6	13.1	1.10
78	.96558	321.6	44.9	1.03	.94317	310.2	26.6	1.05	.94781	311.3	14.1	1.08
79	.96878	322.9	47.2	1.06	.94339	310.0	23.9	1.02	.95010	311.7	11.8	.94
80	.96551	321.6	44.5	1.00	.94339	310.3	25.9	1.02	.94796	311.4	13.3	.93
81	.96671	324.9	59.0	1.28	.94279	311.2	31.5	1.34	.95054	312.4	14.1	1.19
82	.96536	321.6	45.1	1.01	.94348	310.2	26.1	1.05	.94810	311.4	13.5	.97
84	.96977	327.9	75.0	1.64	.94243	313.2	46.6	1.98	.94320	311.6	23.9	1.98
85	.96487	322.2	52.9	1.19	.94354	311.5	28.8	1.24	.95010	311.9	11.8	.92
86	.96736	322.5	46.2	1.06	.94272	309.9	24.1	1.01	.94796	311.1	12.1	.92
87	.96516	321.5	44.7	1.01	.94325	310.2	24.5	1.00	.94772	311.2	12.5	.90
88	.96565	321.6	44.1	1.02	.94385	310.3	24.9	1.03	.94691	311.0	14.7	1.06
89	.96616	321.9	45.8	1.02	.94385	310.4	25.5	.97	.94543	310.6	13.9	.99
90	.96594	322.1	48.2	1.03	.94303	310.3	27.6	1.10	.94446	310.4	14.7	1.01
91	.95343	320.6	58.8	1.27	.92875	306.7	33.7	1.46	.93052	306.4	18.6	1.54
92	.96651	324.5	56.8	1.28	.94601	311.2	26.4	1.07	.94913	311.7	13.3	.96
94	.94451	316.9	55.6	1.25	.91627	302.1	30.8	1.40	.91754	301.7	15.9	1.39
95	.95359	318.8	59.2	1.32	.93047	306.9	30.2	1.33	.93349	307.0	15.5	1.31
96	.96016	321.1	60.1	1.37	.93615	309.5	34.9	1.47	.93593	309.5	21.9	1.73
97	.96339	320.5	42.3	1.34	.94161	309.8	27.6	1.53	.94098	309.2	15.7	1.75
98	.96551	323.2	62.3	1.37	.94392	311.1	30.4	1.27	.94646	311.0	14.5	1.08
99	.96651	322.7	51.9	1.16	.94423	310.5	26.6	1.12	.94477	310.4	13.9	.94
100	.96594	322.2	48.8	1.06	.94212	309.9	25.7	1.06	.94320	309.9	13.5	.88
101	.91182	302.6	35.5	.79	.89857	293.5	14.7	.70	.91562	299.6	6.9	.67
102	.96237	321.5	56.0	1.26	.94272	311.5	33.9	1.46	.94320	310.7	19.6	1.45
103	.92481	311.7	83.3	1.80	.89289	294.4	30.6	1.34	.90450	297.0	13.7	1.34
104	.94096	313.7	49.0	1.09	.92628	304.1	22.7	1.06	.93475	306.7	11.6	1.08
105	.95411	318.0	50.5	1.14	.93174	306.3	25.9	1.18	.93631	307.2	12.5	1.11
106	.95882	319.8	51.7	1.17	.94175	310.3	30.8	1.35	.94468	310.7	17.0	1.38
107	.96587	322.7	53.9	1.22	.94339	311.4	32.1	1.40	.94179	309.9	17.6	1.28
108	.93595	316.6	75.4	1.71	.90373	297.9	30.0	1.48	.90538	297.5	15.7	1.60
109	.95948	319.7	45.1	1.07	.94011	309.4	25.7	1.14	.94528	310.5	14.1	1.15
110	.95913	322.5	73.5	1.40	.93540	308.6	30.2	1.17	.94032	309.2	15.9	1.20
111	.97026	325.7	70.3	1.37	.94295	312.7	41.3	1.50	.95010	313.5	23.5	1.74
112	.97432	327.2	71.1	1.41	.94481	311.7	33.1	1.25	.94973	313.0	22.3	1.40
113	.97651	327.0	49.2	1.00	.94654	312.6	33.9	1.35	.95603	315.3	21.4	1.27
114	.97133	326.5	58.0	1.14	.95080	314.8	37.8	1.48	.95530	315.1	19.4	1.09
115	.97297	327.8	51.5	1.06	.95259	315.2	36.8	1.37	.95486	315.1	20.8	1.10
116	.97352	325.0	47.2	.97	.95475	317.8	33.7	1.21	.95567	316.2	23.3	1.21
117	.96629	322.7	51.5	1.01	.94332	309.9	23.9	.98	.94558	310.1	11.4	1.12
130	.96494	324.0	49.2	1.07	.94004	311.0	25.9	1.01	.94446	311.1	14.3	1.00
131	.94990	326.0	78.9	1.34	.92151	308.4	45.4	1.35	.92318	306.3	27.0	1.61
132	.96023	326.6	61.3	1.08	.93937	312.2	33.3	.96	.94217	311.1	16.8	.91
133	.93035	307.2	14.5	.37	.91106	297.2	9.4	.49	.91917	300.6	4.3	.40
134	.95830	321.6	45.6	.95	.93167	309.0	29.6	1.01	.92957	307.1	17.6	1.04
135	.93064	318.7	70.7	1.81	.90358	299.8	27.6	1.35	.92348	303.7	11.2	1.08
136	.96237	325.8	69.0	1.10	.93795	311.7	31.1	.96	.94135	310.6	15.9	1.03
137	.96452	323.1	43.3	1.07	.94048	309.7	19.6	.96	.94395	310.1	10.2	1.11
150	.97552	335.5	161.0	1.78	.94153	321.1	77.2	1.51	.93556	311.5	46.C	1.51
151	.97346	335.3	166.3	1.79	.93600	316.6	86.2	1.55	.92933	309.7	48.8	1.53
152	.96906	334.4	171.2	1.84	.92912	314.9	90.5	1.60	.92340	308.3	52.7	1.47
153	.96820	337.5	165.7	1.76	.92854	315.2	94.2	1.49	.92199	310.2	57.8	1.46
154	.96813	337.4	165.9	1.75	.93032	316.1	97.0	1.46	.92236	310.7	60.1	1.41
155	.96884	334.2	172.4	1.76	.93123	316.7	101.1	1.42	.92296	310.1	59.6	1.26

[a] h measured in J/m^2-sec-^oK.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Continued

(e) Configuration 21; $P_2 + R_2 + M_3$ - Concluded

Thermo-couple	$M = 2.49$; $T_t = 397^\circ$ K; $p_t = 155\ 467$ N/m^2				$M = 3.51$; $T_t = 390^\circ$ K; $p_t = 257\ 261$ N/m^2				$M = 4.44$; $T_t = 374^\circ$ K; $p_t = 416\ 941$ N/m^2			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
156	.97013	334.9	176.1	1.72	.93265	319.4	97.2	1.37	.92437	311.9	63.5	1.26
157	.97204	334.1	153.6	1.68	.93467	320.5	85.6	1.27	.92703	310.1	56.8	1.26
158	.97084	329.9	112.8	1.24	.95011	317.2	54.1	.99	.94818	314.5	35.5	1.05
159	.98893	334.3	94.6	1.06	.96125	320.0	49.8	.81	.96426	319.2	30.0	.76
160	.98900	333.8	88.5	.96	.95400	319.1	58.8	.90	.94268	314.5	45.1	1.01
161	.98410	332.9	94.0	1.06	.95095	319.2	66.6	1.04	.94195	315.3	52.7	1.08
162	.96045	326.2	115.6	1.24	.94363	314.6	55.4	.85	.93779	311.0	34.9	.86
163	.97928	330.6	68.8	.79	.94916	315.9	49.6	.80	.94468	312.8	30.8	.69
164	.98055	331.2	94.2	1.05	.94332	314.6	52.5	.77	.93475	310.4	37.8	.75
165	.96864	329.2	88.7	.97	.93928	314.1	57.0	.81	.93030	310.0	44.7	.83
166	.97594	329.3	89.1	.91	.93809	314.5	66.4	.87	.92970	311.1	54.7	1.01
167	.97928	328.2	64.1	.93	.94496	314.4	48.0	.87	.93743	312.2	42.3	1.03
168	.96658	326.6	94.6	1.03	.93369	312.8	64.3	.86	.92318	308.0	46.0	.83
169	.96423	325.9	96.4	1.02	.93092	312.4	69.3	.85	.91516	305.8	51.9	.89
170	.94885	325.5	114.4	1.15	.93287	311.3	56.2	.79	.92547	307.9	36.0	.67
171	.96707	327.1	76.2	.84	.94079	314.5	61.1	.86	.93371	310.6	42.1	.76
172	.96962	330.3	95.0	.99	.93526	313.5	65.0	.83	.92600	310.1	47.4	.78
173	.96281	325.4	94.2	1.03	.93078	312.6	64.6	.86	.91071	304.6	53.9	.92
174	.96487	325.9	92.1	.89	.92390	311.4	76.8	.93	.91657	307.5	62.1	1.00
175	.96736	327.5	98.7	.92	.92628	312.4	77.6	.91	.91873	308.8	66.2	.90
176	.98716	333.2	91.1	.95	.96768	323.1	59.0	1.09	.95922	319.2	36.0	1.47
177	.97275	330.3	86.0	.88	.95333	318.1	57.0	.97	.95018	317.0	39.0	1.17
180	.96807	332.0	99.9	.97	.94825	322.1	62.3	.80	.93690	315.1	43.9	.92
181	.97787	336.0	79.3	.97	.94751	318.4	47.8	.88	.94514	315.1	31.5	.79
182	.96430	330.1	74.8	.93	.93294	315.3	57.0	.88	.91657	309.5	46.2	.94
183	.96352	332.3	114.2	1.03	.92688	316.9	72.7	.82	.91503	309.6	55.0	.92
184	.96771	341.9	186.5	1.89	.92763	323.0	105.2	1.55	.91472	311.6	63.3	1.57
185	.96367	335.4	146.1	1.79	.93467	321.7	91.1	1.81	.92289	311.7	49.4	1.53
186	.96864	339.2	165.3	1.90	.92271	316.1	81.1	1.32	.91479	311.0	54.7	1.41
187	.97232	344.9	201.8	1.74	.93032	327.5	106.4	1.42	.91992	316.4	75.0	1.65
400	.96410	331.6	132.2		.92517	313.7	71.7		.91221	305.5	46.6	
401	.95595	326.7	127.7		.91911	309.0	69.5		.90538	303.5	46.8	
402	.95063	330.9	215.7		.90911	314.1	144.0		.89278	306.7	109.3	
403	.94688	330.0	230.2		.90627	314.7	166.1		.89159	307.6	129.1	
404	.94015	324.0	175.7		.89850	305.4	101.7		.88610	299.9	74.4	
405	.95499	324.8	112.8		.91852	307.7	62.1		.90732	302.5	39.6	
406	.91832	308.0	75.8		.87990	291.9	57.0		.87172	290.0	38.8	
407	.92371	309.7	69.9		.88370	291.6	39.8		.87668	289.0	21.0	
408	.94473	315.1	52.5		.90993	299.0	29.2		.90249	296.5	16.1	
409	.91648	309.1	82.5		.88370	293.0	41.5		.88284	290.9	18.0	
410	.91957	310.2	81.5		.88572	293.4	39.0		.88692	291.7	17.8	
411	.94230	315.7	59.6		.90986	299.8	29.2		.90820	298.5	13.7	
412	.91374	301.0	13.7		.89102	289.9	8.4		.90093	294.0	2.7	
413	.93020	307.5	22.9		.90538	295.2	11.6		.91221	298.2	4.7	
414	.92444	305.2	19.6		.90201	293.6	8.4		.91331	298.2	3.5	
415	.91817	308.0	43.5		.90822	296.7	11.6		.93016	303.9	3.1	

[a] h measured in J/m^2-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Continued

(f) Configuration 22; $P_2 + R_2 + M_4$

Thermo-couple	M = 2.49; T_t = 399° K; p_t = 156 281 N/m^2				M = 3.51; T_t = 397° K; p_t = 258 745 N/m^2				M = 4.44; T_t = 382° K; p_t = 414 356 N/m^2			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.97234	325.2	46.2	.98	.96352	318.7	23.9	.94	.94415	317.3	14.3	.96
2	.97504	326.6	48.6	.99	.96515	319.1	22.3	.93	.94570	317.5	12.1	.95
3	.97765	327.4	47.8	.99	.96910	320.4	22.3	.95	.95037	318.7	10.0	.83
4	.97773	327.1	45.8	1.00	.97032	320.7	21.2	.92	.95294	319.6	10.8	.98
5	.97744	327.2	47.4	1.00	.97023	320.8	22.5	.93	.95385	319.9	10.6	.88
6	.97716	327.3	48.8	.99	.97017	320.8	22.5	.92	.95448	320.2	11.0	.96
7	.97680	327.0	47.4	1.01	.97017	320.7	23.5	1.01	.95509	320.4	10.8	.88
8	.97680	326.9	47.2	1.00	.97046	320.8	22.1	.92	.95601	320.6	10.8	.95
37	.99124	328.7	21.4	.46	.99181	325.5	7.4	.35				
38	.98742	327.4	20.4	.44	.98954	324.5	6.3	.30	.96603	323.1	2.0	.22
39	.98551	326.7	21.0	.45	.98910	324.2	6.5	.31	.96297	322.0	3.1	.32
40	.98260	326.0	22.7	.48	.98696	323.6	6.3	.30	.95866	320.7	3.5	.37
41	.98182	326.0	25.9	.54	.98576	323.4	7.4	.36	.95670	320.1	4.9	.50
42	.98176	326.1	26.1	.56	.98483	323.2	8.8	.40	.95796	320.5	5.7	.61
43	.98140	326.2	27.2	.58	.98285	322.7	9.4	.46	.95969	321.0	6.1	.64
44	.98063	326.2	29.8	.64	.98049	322.2	11.6	.57	.95997	321.2	5.9	.60
45	.98083	326.4	31.7	.71	.97886	321.9	12.9	.66	.96046	321.5	6.9	.68
46	.98112	326.7	33.1	.74	.97744	321.7	14.5	.75	.96101	321.9	8.2	.85
47	.98225	327.4	35.1	.72	.97657	321.6	15.7	.83	.96262	322.5	8.4	.89
48	.98302	327.9	37.0	.69	.97501	321.4	17.8	.65	.96366	323.1	10.4	1.06
49	.98452	328.5	38.2	.67	.97388	321.3	18.8	.68	.96423	323.5	12.1	.87
50	.98735	329.5	39.4	.64	.97515	321.9	19.8	.70	.96353	323.6	13.5	.86
51	.99655	335.0	37.2	.66	.98469	324.5	15.7	.63	.96715	324.6	10.4	.76
54	.97461	326.5	50.9	1.06	.96434	319.0	22.5	.94	.94493	317.4	13.3	.97
55	.97744	327.3	48.4	1.00	.97010	320.9	23.5	.93	.95420	320.2	12.1	.91
56	.97687	327.1	47.8	1.03	.96903	320.6	23.3	.90	.95335	320.0	12.3	.87
57	.97744	327.0	46.2	1.01	.96974	320.7	22.7	.89	.95315	320.0	12.3	.88
58	.97773	327.1	45.8	1.00	.96961	320.9	23.9	.88	.95239	319.9	13.1	.88
59	.97857	327.7	46.4	1.00	.97003	321.2	24.7	.90	.95113	319.6	13.9	.94
60	.97928	327.7	46.0	.98	.97059	321.3	24.5	.91	.94863	318.7	14.9	.96
61	.97751	327.3	48.4	1.01	.97095	321.1	22.7	.92	.95705	321.1	11.4	.89
62	.97561	326.5	47.2	1.00	.96903	320.5	23.1	.92	.95559	320.6	11.8	.87
63	.97638	326.7	47.0	1.02	.96974	320.9	23.5	.91	.95587	320.9	12.7	.91
64	.97716	327.0	45.8	.97	.96988	321.0	25.1	.91	.95398	320.4	13.9	.85
65	.97674	327.0	47.8	1.01	.97017	320.9	22.9	.92	.95677	321.0	11.8	.89
66	.97694	327.0	46.2	.99	.96968	321.0	24.9	.92	.95440	320.5	13.9	.92
67	.97851	328.2	53.1	1.11	.96981	321.6	28.4	1.15	.95427	320.7	15.1	1.25
68	.97638	327.1	49.6	1.06	.97017	321.0	23.9	.96	.95727	321.2	11.8	.85
69	.97561	326.5	46.0	1.01	.96903	320.6	22.7	.92	.95559	320.7	12.7	1.00
70	.97504	326.2	46.0	1.01	.96854	320.5	24.3	.91	.95461	320.4	13.1	.88
71	.97680	326.9	46.0	1.00	.96974	321.0	24.5	.90	.95468	320.5	12.9	.86
72	.97758	327.1	45.4	1.02	.97074	321.3	24.3	.92	.95364	320.2	13.5	.86
73	.97674	327.4	48.8	1.00	.96974	321.1	24.5	.90	.95120	319.5	14.9	.92
74	.97362	326.1	48.8	1.05	.96768	320.4	25.9	1.07	.95559	320.8	12.5	1.07
75	.97652	326.7	45.1	.99	.96939	320.8	25.3	.95	.95461	320.4	13.5	.94
76	.98253	330.6	61.7	1.33	.97573	324.5	33.3	1.46	.95796	322.4	17.4	1.49
77	.97716	327.9	54.5	1.17	.96818	320.9	27.8	1.14	.95481	320.6	14.1	1.19
78	.97610	326.4	43.9	1.01	.96890	320.5	23.5	.93	.95405	320.2	13.3	1.02
79	.97716	330.0	59.4	1.33	.96832	321.5	31.1	1.32	.95364	320.6	17.2	1.35
80	.97638	326.6	45.4	1.02	.96932	320.6	23.1	.91	.95440	320.3	12.9	.90
81	.97751	328.9	61.7	1.34	.96868	322.1	33.5	1.43	.95231	320.5	18.4	1.55
82	.97659	326.7	45.1	1.01	.96903	320.4	22.7	.91	.95420	320.2	12.3	.88
84	.97871	329.4	65.8	1.44	.96988	322.5	33.9	1.44	.95266	320.6	19.0	1.58
85	.97588	327.7	60.1	1.35	.96574	320.6	30.4	1.31	.95078	319.7	16.8	1.30
86	.97568	327.1	51.3	1.18	.96761	320.4	25.3	1.06	.95412	320.2	13.1	1.00
87	.97595	326.7	47.2	1.07	.96890	320.4	22.5	.92	.95357	320.0	12.3	.88
88	.97659	326.5	44.1	1.02	.96946	320.5	21.4	.88	.95252	319.6	12.9	.93
89	.97659	326.7	44.1	.99	.96961	320.7	23.1	.88	.95141	319.2	13.7	.97
90	.97588	326.8	46.6	.99	.96917	320.6	23.3	.93	.95030	319.0	13.7	.94
91	.97093	325.4	48.8	1.06	.96367	319.2	27.0	1.17	.94758	318.2	14.9	1.24
92	.97645	327.7	53.3	1.20	.96845	320.9	27.6	1.12	.95405	320.3	13.9	1.00
94	.96783	324.2	50.7	1.14	.96293	318.7	24.1	1.09	.94613	317.4	12.7	1.11
95	.96966	324.9	50.7	1.13	.96264	318.9	26.4	1.16	.94695	317.9	13.9	1.17
96	.97362	326.5	51.9	1.18	.96574	320.5	30.2	1.28	.94821	319.0	17.6	1.39
97	.97411	325.0	38.0	1.20	.96768	320.0	24.1	1.34	.94952	318.7	13.7	1.52
98	.97616	327.7	54.5	1.20	.96818	320.9	28.6	1.20	.95141	319.5	14.9	1.11
99	.97623	327.3	51.3	1.15	.96968	321.4	23.9	1.01	.95044	319.0	14.1	.96
100	.97532	326.8	49.0	1.06	.96832	320.2	22.7	.93	.94891	318.4	13.9	.91
102	.97305	326.1	50.0	1.13	.96861	321.4	29.6	1.27	.95100	319.8	17.6	1.30
103	.97362	323.2	23.1	.50	.97301	320.0	11.4	.50	.94299	315.6	5.3	.52
104	.96810	324.5	51.5	1.15	.96279	318.5	23.3	1.09	.94211	315.9	10.4	.96
105	.97150	325.7	51.9	1.17	.96449	319.2	24.7	1.12	.95009	318.7	12.7	1.13
106	.97163	325.3	48.2	1.09	.96825	320.7	26.4	1.15	.95252	320.0	15.1	1.23
107	.97510	326.9	50.0	1.13	.96868	321.2	27.8	1.21	.94793	318.5	16.5	1.21
108	.96358	321.4	37.8	.86	.96442	317.9	16.5	.82	.93590	313.6	10.0	1.02
109	.97256	325.8	48.6	1.16	.96790	320.4	24.9	1.10	.95329	320.0	12.5	1.02
110	.97376	325.4	39.4	.75	.96412	318.4	20.8	.81	.95683	321.7	16.8	1.26
111	.97665	326.9	44.7	.87	.97473	323.8	29.0	1.05	.95629	321.7	17.6	1.30
112	.98140	331.2	56.0	1.11	.98000	325.4	28.6	1.08	.96477	324.6	16.8	1.05
113	.98543	330.4	52.5	1.07	.98029	327.7	27.6	1.10	.96477	324.6	16.5	.98
114	.98423	330.1	52.5	1.03	.97964	326.6	32.7	1.28	.96332	324.4	19.2	1.08
115	.98430	330.1	52.5	1.08	.97949	326.5	32.3	1.21	.96221	324.2	20.6	1.09
116	.98508	331.8	50.5	1.04	.98091	328.7	30.0	1.08	.96158	324.2	22.5	1.17
117	.97638	327.4	50.9	1.00	.97023	320.7	22.9	.94	.95315	319.6	8.4	.82
130	.97468	330.5	47.6	1.03	.96574	320.9	23.5	.91	.95100	319.9	13.5	.94
131	.96471	336.4	60.7	1.03	.95072	318.6	38.2	1.14	.93517	315.5	20.2	1.21
132	.96520	326.7	57.6	1.01	.95761	319.8	29.6	.85	.94604	319.2	19.0	1.03
133	.97702	325.2	21.9	.55	.97388	321.5	13.5	.71	.95823	321.0	5.9	.56
134	.97121	326.9	43.5	.91	.95805	319.0	25.9	.88	.94082	316.9	15.3	.90
135	.96754	323.6	30.8	.79	.96367	317.7	11.0	.54	.93706	313.4	3.3	.31
136	.97108	333.0	68.4	1.09	.96390	324.8	31.9	.99	.94987	320.3	15.9	1.03

[a] h measured in J/m^2-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Continued

(f) Configuration 22; $P_2 + R_2 + M_4$ - Concluded

Thermocouple	M = 2.49; T_t = 399° K; p_t = 156 281 N/m²				M = 3.51; T_t = 397° K; p_t = 258 745 N/m²				M = 4.44; T_t = 382° K; p_t = 414 356 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
137	.97561	330.0	42.3	1.04	.96661	320.5	19.4	.95	.95170	319.6	9.2	1.00
150	1.00000	337.4	57.6	.64	1.00000	331.2	25.5	.50	.99193	334.1	20.2	.66
151	1.00000	337.2	59.6	.64	.99780	330.9	29.0	.52	.99040	334.2	19.2	.60
152	1.00000	338.5	69.9	.75	1.00000	333.8	43.7	.77	.98440	331.4	18.4	.51
153	1.00000	341.2	85.8	.91	.99964	335.0	51.5	.82	.97702	329.4	22.7	.57
154	1.00000	345.2	99.9	1.05	.99586	335.4	55.0	.83	.97313	328.5	26.8	.63
155	1.00000	342.4	107.5	1.10	.99110	334.1	56.8	.80	.96895	327.6	30.8	.65
156	1.00000	343.9	104.0	1.01	.98590	331.2	58.0	.82	.96395	326.3	34.3	.68
157	.99965	339.6	95.2	1.04	.98412	330.0	52.9	.79	.96275	325.5	30.6	.68
158	.98883	333.2	67.8	.75	.97608	329.2	56.2	1.03	.94241	318.2	27.6	.81
159	.99314	339.1	88.2	.99	.98505	330.3	52.1	.84	.96275	325.9	33.3	.84
160	.99378	337.6	94.4	1.03	.97929	329.1	59.6	.92	.95057	323.1	44.7	1.00
161	.99230	339.9	94.6	1.07	.97757	329.5	65.2	1.02	.95044	323.9	50.9	1.04
162	.97758	331.5	85.0	.91	.96486	324.5	63.3	.97	.94256	319.9	39.6	.97
163	.97419	333.2	90.7	1.04	.96618	323.6	52.7	.85	.93822	317.8	33.3	.75
164	.98346	335.1	83.3	.93	.96790	324.5	52.5	.77	.94422	320.1	36.8	.73
165	.98678	337.0	89.1	.98	.96618	324.5	56.6	.80	.93938	319.2	42.3	.78
166	.98642	335.0	95.4	.97	.96605	325.1	62.7	.82	.93741	319.5	50.9	.94
167	.99131	333.9	66.8	.97	.97415	328.2	44.7	.81	.94444	320.9	39.8	.97
168	.98430	333.9	92.7	1.01	.96078	323.1	58.8	.78	.93480	318.0	45.8	.82
169	.98041	332.5	91.5	.97	.95479	321.6	65.4	.81	.92895	316.4	49.8	.85
170	.96938	331.0	113.2	1.14	.94783	321.0	64.8	.91	.93626	318.7	46.2	.87
171	.96314	327.1	98.3	1.09	.95332	320.9	60.9	.86	.92294	313.5	45.1	.81
172	.97278	332.4	90.3	.94	.95693	322.4	62.9	.81	.92779	315.8	47.4	.78
173	.97758	333.5	85.4	.93	.95227	320.8	62.1	.83	.92431	315.1	51.1	.87
174	.97829	332.5	96.6	.93	.95110	321.1	66.2	.80	.92612	316.6	59.9	.96
175	.97561	338.1	89.3	.84	.95376	322.5	69.3	.81	.92532	316.9	63.5	.86
176	.98905	338.6	96.4	1.00	.97408	329.7	55.8	1.03	.95475	322.7	30.2	1.23
177	.97765	332.6	97.2	1.00	.96078	324.5	61.1	1.04	.94226	319.2	35.5	1.07
180	.97419	335.1	95.8	.93	.96545	329.5	67.0	.86	.93510	319.4	39.0	.82
181	.98169	334.1	69.3	.85	.97130	327.1	43.3	.80	.94563	321.3	29.4	.74
182	.97504	337.0	82.3	1.03	.95183	323.7	60.5	.93	.92229	315.8	42.9	.87
183	.96754	337.2	99.5	.90	.94666	324.7	73.5	.83	.92113	316.9	51.7	.87
184	.99286	343.1	84.2	.85	.98305	330.5	42.9	.63	.98734	335.2	29.6	.74
185	.99463	344.4	86.2	1.06	.98554	335.2	51.5	1.02	.97800	333.4	34.1	1.06
186	1.00000	342.4	77.6	.89	.99168	338.5	47.6	.77	.96971	328.6	24.7	.64
187	.99498	349.5	117.9	1.02	.98298	337.3	66.0	.88	.95851	326.9	37.4	.82
500	.96265	332.7	117.3		.94464	318.4	65.6		.92061	312.0	34.9	
501	.96570	328.2	90.5		.95042	317.6	45.4		.92691	312.8	26.1	
502	.95216	328.0	134.6		.93021	315.6	81.3		.90687	309.0	51.3	
503	.94650	326.9	142.2		.92001	313.7	98.9		.89565	306.1	56.4	
504	.95048	324.7	111.1		.92777	311.7	60.9		.90623	306.8	33.9	
505	.96938	327.9	69.9		.95376	317.6	35.1		.93039	313.6	20.2	
506	.93863	317.5	76.0		.91460	304.0	36.0		.89318	300.9	18.8	
507	.94591	320.0	75.8		.92571	307.5	33.1		.90550	304.2	15.3	
508	.96591	324.0	49.6		.95027	314.1	21.4		.92851	311.5	10.6	
509	.93966	318.5	83.8		.92015	306.9	42.9		.90608	305.1	20.6	
510	.94759	320.0	73.3		.93037	309.4	36.8		.91563	308.0	18.6	
511	.97079	325.4	48.0		.95849	316.6	20.8		.93893	314.9	10.6	
512	.94584	320.2	82.3		.92889	309.5	41.9		.91491	307.9	20.0	
513	.95576	322.0	69.0		.93894	311.7	34.9		.92287	310.1	16.1	
514	.97758	328.0	48.8		.96574	319.0	19.6		.94444	316.6	8.6	
515	1.00000	334.4	25.3		1.00000	329.9	8.8		.98162	328.3	1.6	
516	1.00000	336.0	28.2		1.00000	331.4	11.2		.98392	329.2	3.3	
517	1.00000	335.4	34.3		1.00000	331.2	13.3		.98316	329.1	3.7	

[a] h measured in J/m²-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Continued

(g) Configuration 23; $P_2 + R_2 + M_8$

Thermocouple	M = 2.49; T_t = 399° K; p_t = 154 171 N/m^2				M = 3.51; T_t = 397° K; p_t = 305 189 N/m^2				M = 4.44; T_t = 382° K; p_t = 417 372 N/m^2			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
1	.96329	324.8	46.2	.98	.96003	318.7	23.9	.94	.94561	316.5	12.9	.86
2	.96658	326.1	48.8	.99	.96212	319.2	22.3	.93	.94721	316.6	11.2	.89
3	.96953	327.1	48.0	.99	.96608	320.5	21.7	.92	.95193	318.0	10.8	.90
4	.96960	326.9	46.6	1.02	.96765	320.9	21.4	.93	.95444	318.8	10.2	.93
5	.96925	326.9	47.6	1.01	.96750	321.0	22.7	.94	.95536	319.1	10.4	.86
6	.96938	327.1	49.6	1.01	.96736	321.0	23.7	.97	.95599	319.4	10.2	.89
7	.96903	326.9	47.4	1.01	.96729	320.9	22.3	.96	.95647	319.5	9.8	.80
8	.96868	326.7	47.6	1.01	.96723	320.9	22.3	.93	.95669	319.5	10.4	.91
9	.96848	326.7	48.6	1.01	.96707	320.9	22.5	.93	.95676	319.6	10.0	.88
10	.96813	326.5	47.2	1.00	.96679	320.7	22.5	.95	.95669	319.5	10.0	.79
11	.96798	326.4	47.0	1.01	.96679	320.7	22.5	.96	.95676	319.5	10.6	.91
12	.96756	326.4	48.0	1.00	.96630	320.5	22.3	.93	.95619	319.4	10.4	.91
13	.96897	327.0	48.6	1.00	.96694	320.9	22.7	.90	.95682	319.6	10.4	.85
14	.97100	327.6	47.6		.96743	322.7	21.0		.95759	319.7	9.4	
15	.97374	329.4	59.4	1.23	.97190	322.4	23.9	1.00	.96131	320.9	9.6	.85
16	.97549	330.1	59.6	1.25	.97323	324.9	32.3	1.32	.96411	322.7	14.1	1.30
17	.97823	331.2	61.7	1.28	.97614	325.0	33.5	1.40	.96516	323.3	16.3	1.63
18	.98040	332.4	65.2	1.38	.98336	327.6	33.7	1.46	.97124	325.4	17.4	1.67
19	.98992	339.5	86.4	1.83	.99781	334.0	48.0	2.10	.98482	330.9	23.5	2.13
49	1.00000	335.4	29.8	.53	1.00000	334.2	11.2	.40	.99958	333.4	3.7	.26
50	.99369	333.7	33.3	.54	1.00000	332.6	13.3	.47	.99602	332.4	5.3	.34
51	.98986	330.5	15.5	.28	1.00000	331.1	6.1	.25	.99237	330.7	3.1	.22
54	.96588	326.0	48.2	1.00	.96099	319.0	22.9	.96	.94626	316.4	11.0	.81
55	.96932	327.1	48.8	1.01	.96694	321.0	23.9	.95	.95556	319.4	10.6	.80
56	.96897	326.9	47.0	1.01	.96608	320.7	24.3	.94	.95479	319.2	11.6	.83
57	.96938	326.9	46.0	1.01	.96672	320.9	23.3	.91	.95451	319.1	12.9	.93
58	.96912	326.6	45.1	.98	.96679	321.0	25.1	.92	.95346	318.9	13.3	.89
59	.97052	327.4	46.6	1.00	.96736	321.3	25.9	.95	.95228	318.7	14.1	.96
60	.97107	327.4	49.6	1.06	.96814	321.5	25.9	.96	.94954	317.7	14.3	.92
61	.96848	326.7	48.2	1.00	.96701	321.0	23.7	.96	.95746	319.9	10.8	.84
62	.96813	326.5	46.6	.99	.96623	320.7	24.1	.96	.95696	319.8	10.6	.78
63	.96883	326.7	46.4	1.00	.96729	321.1	24.5	.94	.95724	320.0	12.1	.87
64	.96967	326.9	45.1	.96	.96736	321.2	25.7	.93	.95529	319.4	13.3	.81
65	.96813	326.5	46.8	.99	.96658	320.9	24.1	.97	.95752	320.0	11.0	.83
66	.96953	326.9	48.0	1.03	.96736	321.3	27.4	1.02	.95542	319.6	13.5	.89
67	.97275	328.0	47.8	1.00	.96871	321.4	22.7	.92	.95949	320.5	9.8	.81
68	.96868	326.6	46.8	1.00	.96652	321.4	24.1	.97	.95794	320.1	11.0	.79
69	.96813	326.5	45.4	1.00	.96652	320.9	23.7	.96	.95696	319.9	11.0	.87
70	.96715	326.0	47.2	1.04	.96608	320.7	24.9	.93	.95556	319.5	12.3	.82
71	.96960	327.0	45.8	1.00	.96743	321.2	25.5	.93	.95577	319.6	12.7	.85
72	.97023	327.1	44.9	1.01	.96842	321.5	24.9	.95	.95472	319.2	13.1	.83
73	.96953	327.3	53.5	1.10	.96750	321.4	26.4	.96	.95206	318.5	13.7	.85
74	.97304	328.8	53.1	1.15	.96935	321.5	21.9	.90	.96046	320.7	9.8	.84
75	.96938	326.7	45.4	1.00	.96723	321.1	25.5	.96	.95577	319.5	12.5	.87
76	.98719	336.7	92.7	2.00	.98564	334.2	49.0	2.14	.97572	328.2	25.9	2.23
77	.97597	331.4	73.1	1.57	.96878	323.3	38.2	1.57	.96137	322.7	20.2	1.71
78	.96938	326.6	43.5	1.00	.96694	320.8	23.9	.94	.95529	319.3	11.8	.91
79	.98585	338.0	84.6	1.90	.98393	330.0	55.0	2.34	.97445	327.9	27.4	2.16
80	.97444	328.7	47.6	1.07	.96807	321.1	24.3	.96	.95612	319.6	12.5	.87
81	.99041	337.3	86.2	1.88	.99659	333.3	43.9	1.87	.98537	331.1	23.9	2.02
82	.97359	329.5	59.0	1.32	.97190	322.2	23.3	.93	.95696	319.8	11.6	.84
84	.99308	336.8	68.0	1.49	.99852	333.6	41.3	1.76	.98887	332.5	23.3	1.93
85	.98523	334.5	71.3	1.61	.98314	329.4	48.6	2.09	.96929	326.4	28.8	2.24
86	.98075	335.6	77.6	1.78	.97232	326.6	59.9	2.50	.95304	321.6	32.7	2.50
87	.97612	334.4	80.9	1.83	.96404	322.0	41.3	1.68	.95599	320.5	18.0	1.29
88	.97269	329.4	63.9	1.48	.97154	322.1	22.1	.91	.95466	319.1	13.3	.96
89	.97486	329.1	53.3	1.19	.96835	321.3	23.5	.89	.95263	318.4	12.1	.86
90	.97008	327.1	50.0	1.07	.96736	321.0	24.5	.98	.95151	318.1	12.9	.89
92	.98060	332.5	65.0	1.47	.97855	327.7	48.8	1.98	.95682	322.6	31.7	2.28
95	.97604	329.8	54.7	1.22	.97670	325.1	31.3	1.38	.96649	324.0	18.8	1.59
96	.94783	321.6	68.2	1.55	.93743	313.4	43.3	1.83	.91913	309.1	27.2	2.15
97	.94114	317.0	44.3	1.40	.93308	310.4	31.7	1.76	.92240	309.5	21.9	2.43
98	.96511	326.5	57.4	1.27	.96643	322.5	39.0	1.63	.94939	319.1	24.1	1.79
99	.97094	328.9	62.5	1.40	.96765	324.7	45.6	1.92	.94023	317.3	33.3	2.26
100	.96988	331.1	71.9	1.56	.96026	323.4	52.7	2.17	.93688	315.7	29.6	1.93
102	.94274	324.9	67.6	1.53	.92580	309.1	4C.7	1.75	.90487	304.0	23.5	1.74
106	.94988	322.5	69.9	1.58	.93523	312.1	38.8	1.70	.91797	308.0	20.2	1.65
107	.95510	322.6	51.5	1.16	.95268	316.4	26.4	1.15	.93593	313.0	14.5	1.06
109	.95313	323.4	67.2	1.60	.94214	314.3	37.4	1.65	.93018	311.9	20.6	1.68
110	.99238	331.5	15.1	.29	1.00000	330.7	5.1	.20	.99042	330.0	2.5	.18
111	.98830	329.9	13.1	.25	1.00000	329.9	5.5	.20	.98915	329.5	2.2	.17
112	.98578	330.2	26.1	.52	.99144	327.2	9.0	.34	.98677	328.6	2.7	.17
113	.97724	333.6	67.2	1.37	.98152	326.7	23.9	.95	.97334	325.1	9.4	.55
114	.96253	329.4	73.9	1.45	.96033	321.6	45.4	1.78	.95361	319.9	18.6	1.05
115	.95916	327.1	64.8	1.34	.95106	318.6	48.8	1.82	.93884	315.7	23.3	1.23
116	.96491	328.2	58.8	1.21	.95952	320.4	41.7	1.50	.93804	315.3	22.9	1.19
117	.96848	327.0	51.7	1.01	.96765	321.0	22.5	.92	.95479	318.8	10.2	1.00
130	.96721	328.2	46.8	1.01	.96375	321.0	23.9	.93	.95206	319.0	13.1	.91
132	.98075	339.2	99.5	1.75	.97139	331.6	59.0	1.70	.94881	321.7	32.1	1.74
134	.95075	324.8	65.2	1.36	.94229	319.3	45.8	1.56	.92705	314.2	30.2	1.78
136	.96463	329.9	69.0	1.10	.96183	322.8	30.6	.95	.94961	318.7	14.5	.93
137	.97254	329.2	42.3	1.04	.96637	321.0	17.8	.87	.95333	318.6	8.4	.91
138	.98417	339.0	64.8	1.29	.97535	328.6	34.9	1.24	.95927	323.1	19.0	1.48
150	.98789	331.9	34.3	.38	1.00000	331.8	12.3	.24	.99637	332.0	4.3	.14
151	.98256	330.2	37.2	.40	.99907	330.0	13.1	.24	.99383	331.0	5.3	.17
152	.97744	329.3	44.1	.47	.99130	327.9	16.3	.29	.98845	329.4	6.5	.18
153	.97639	330.2	56.8	.60	.99079	328.8	24.9	.39	.98972	330.5	11.0	.28
154	.98403	334.5	75.2	.79	.99852	332.7	37.2	.56	.99622	333.7	17.0	.40
155	.98460	336.0	87.4	.89	.98272	327.8	37.6	.53	.98320	329.5	17.4	.37
156	.98515	337.1	98.1	.96	.97013	323.5	36.4	.51	.96907	324.6	17.8	.35
157	.98550	337.0	100.1	1.09	.97501	325.1	37.4	.56	.97082	325.1	17.4	.39

[a] h measured in J/m^2-sec-°K.

TABLE V.- TABULAR LISTING OF HEAT-TRANSFER MEASUREMENTS OBTAINED FOR PLATE AND RAMP WITH STRINGERS - Concluded

(g) Configuration 23; $P_2 + R_2 + M_8$ - Concluded

Thermocouple	M = 2.49; T_t = 399° K; p_t = 154 171 N/m²				M = 3.51; T_t = 397° K; p_t = 305 189 N/m²				M = 4.44; T_t = 382° K; p_t = 417 372 N/m²			
	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$	$\frac{T_e}{T_t}$	T_w, °K	h (a)	$\frac{h}{h_{(7)}}$
158	.97674	327.9	33.9	.37	.99562	328.7	12.7	.23	.99173	330.4	4.7	.14
159	.96071	325.7	51.5	.58	.98166	324.0	11.4	.18	.97782	325.7	4.5	.11
160	.96792	330.8	97.2	1.06	.95937	326.0	60.5	.93	.94669	320.4	37.8	.84
161	.97240	332.1	94.2	1.06	.95827	327.4	61.1	.95	.93994	319.0	43.5	.89
162	.97766	330.6	57.0	.61	.98988	328.7	25.9	.40	.98775	329.7	10.0	.25
163	.97289	329.2	58.2	.67	.98464	327.1	27.2	.44	.98502	329.0	11.0	.25
164	.97289	328.0	47.0	.52	.97911	324.4	21.2	.31	.97845	326.2	8.2	.16
165	.94607	322.5	84.0	.92	.94192	314.6	41.3	.58	.94474	316.7	18.8	.35
166	.96034	330.6	96.8	.99	.95099	319.9	63.1	.82	.93709	317.2	39.6	.73
167	.97394	329.6	61.5	.89	.96566	324.7	39.4	.71	.94518	318.9	29.6	.72
168	.94280	321.7	89.3	.97	.93494	312.7	46.4	.62	.92981	312.4	21.7	.39
169	.93748	320.5	95.0	1.01	.92934	312.1	57.0	.70	.91753	308.7	27.4	.47
170	.96638	329.7	89.1	.89	.95959	320.0	37.8	.53	.95626	320.1	16.8	.31
171	.95594	327.7	108.7	1.20	.96566	324.4	58.6	.83	.95696	322.1	27.2	.49
172	.94185	325.5	141.8	1.47	.94487	320.4	85.2	1.09	.93310	316.3	44.5	.74
173	.93536	320.4	105.6	1.15	.92521	313.1	63.9	.86	.91373	308.7	35.5	.61
174	.95502	326.7	103.2	1.00	.94516	319.6	62.1	.75	.92268	312.2	40.2	.65
175	.96253	330.2	85.2	.80	.94730	318.3	59.9	.70	.91825	312.0	41.9	.57
176	.96329	328.0	51.9	.54	.98280	324.4	10.8	.20	.97537	324.7	2.9	.12
177	.97436	328.6	48.6	.50	.97769	323.6	18.6	.32	.97279	324.2	6.7	.20
180	.96091	327.6	61.3	.59	.96991	322.4	22.1	.28	.96446	322.9	11.6	.24
181	.95243	323.7	52.9	.65	.95864	318.4	17.8	.33	.96564	322.5	8.0	.20
182	.93638	329.1	110.7	1.38	.92433	313.6	61.1	.94	.92058	311.4	26.4	.54
183	.93560	329.5	115.4	1.04	.92580	321.3	63.3	.72	.90675	307.6	32.3	.54
184	.96763	327.8	45.1	.46	.98449	326.7	17.6	.26	.98384	328.5	7.1	.18
185	.97234	329.5	44.7	.55	.98307	326.5	18.4	.36	.98075	327.4	6.7	.21
186	.97374	331.7	56.8	.65	.98358	327.9	24.9	.41	.98399	329.5	11.0	.28
187	.97963	338.8	100.3	.87	.99059	333.1	41.9	.56	.99112	333.4	18.8	.41
900	.97514	339.6	183.4		.96033	330.4	111.1		.93811	320.7	68.8	
901	.95720	331.1	135.0		.93861	319.9	77.2		.91840	311.4	43.5	
902	.99244	336.3	61.5		.98542	328.2	33.1		.96262	322.8	17.6	
903	.95986	335.0	198.8		.93273	321.4	152.4		.90552	314.1	101.1	
904	.95031	332.6	203.9		.91784	321.7	172.6		.88935	310.5	115.0	
905	.93850	334.9	263.7		.89753	321.5	211.2		.86841	306.1	110.9	
906	.91839	322.8	214.5		.87758	302.3	131.6		.85051	292.6	67.8	
907	.97240	329.5	61.3		.96466	322.2	31.7		.94299	316.0	15.9	
908	.92458	314.2	85.4		.89370	298.9	52.1		.86834	292.9	32.5	
909	.91548	311.7	85.4		.88782	297.2	49.6		.86644	291.4	24.7	
910	.90738	309.2	90.1		.86779	290.2	45.8		.84971	285.5	20.6	
911	.89522	305.2	75.0		.86101	287.1	30.6		.85276	285.2	12.3	
912	.95775	323.5	47.8		.95156	315.6	20.6		.93316	311.7	9.4	
913	.91374	310.2	81.9		.88620	296.1	47.8		.86557	291.4	28.2	
914	.91941	312.7	74.6		.89621	299.3	39.0		.87742	295.1	21.4	
915	.92116	317.8	119.7		.89326	302.7	74.8		.87314	297.1	40.0	
916	.91526	312.8	101.9		.88509	296.0	49.0		.87604	293.9	19.6	
917	.97008	327.6	39.2		.97019	321.6	16.3		.95263	318.0	6.9	

[a] h measured in J/m²-sec-°K.

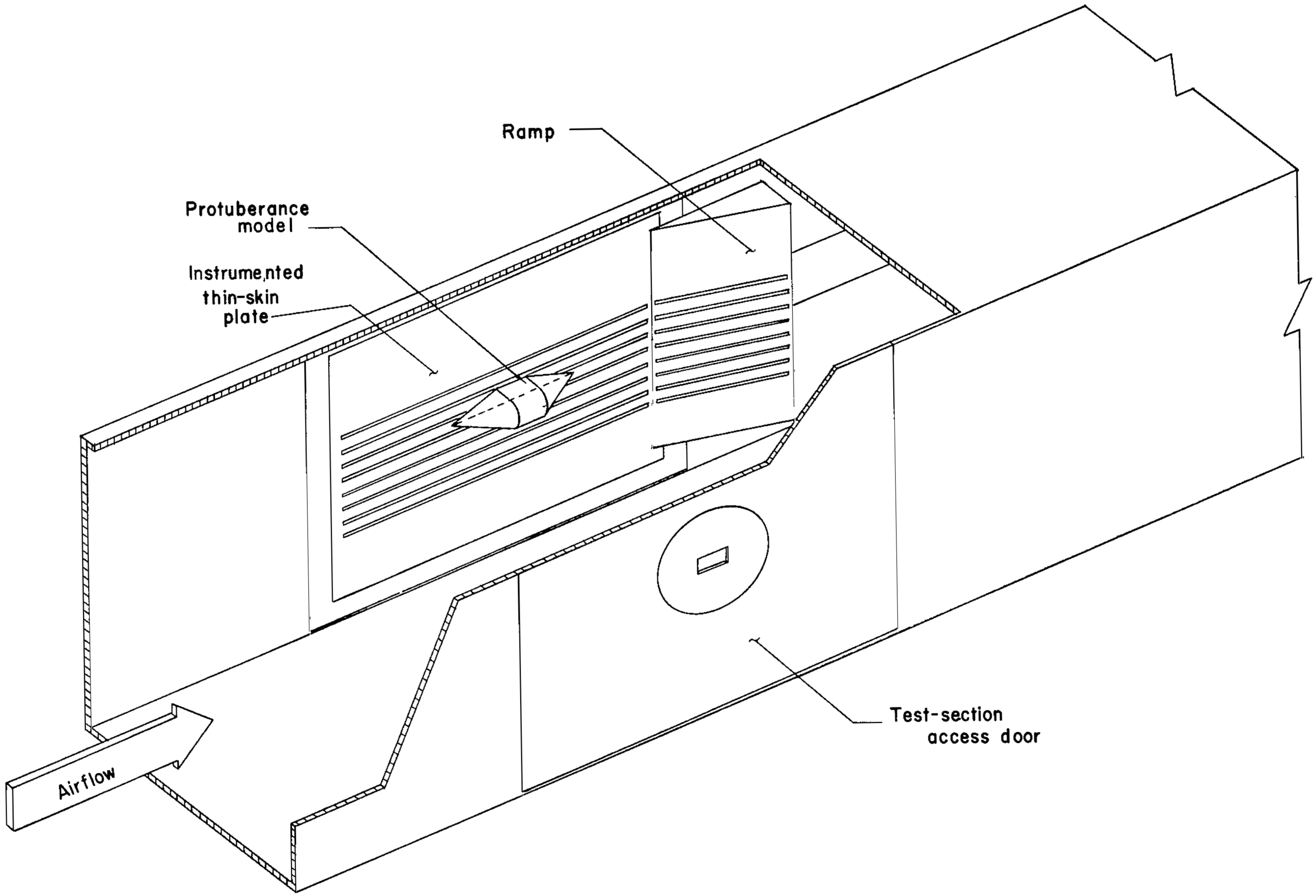
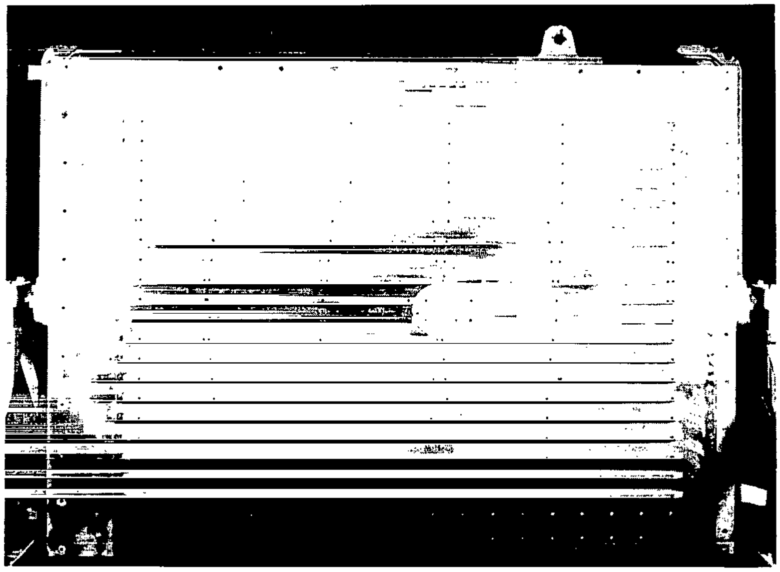


Figure 1.- Typical model installed in test section.



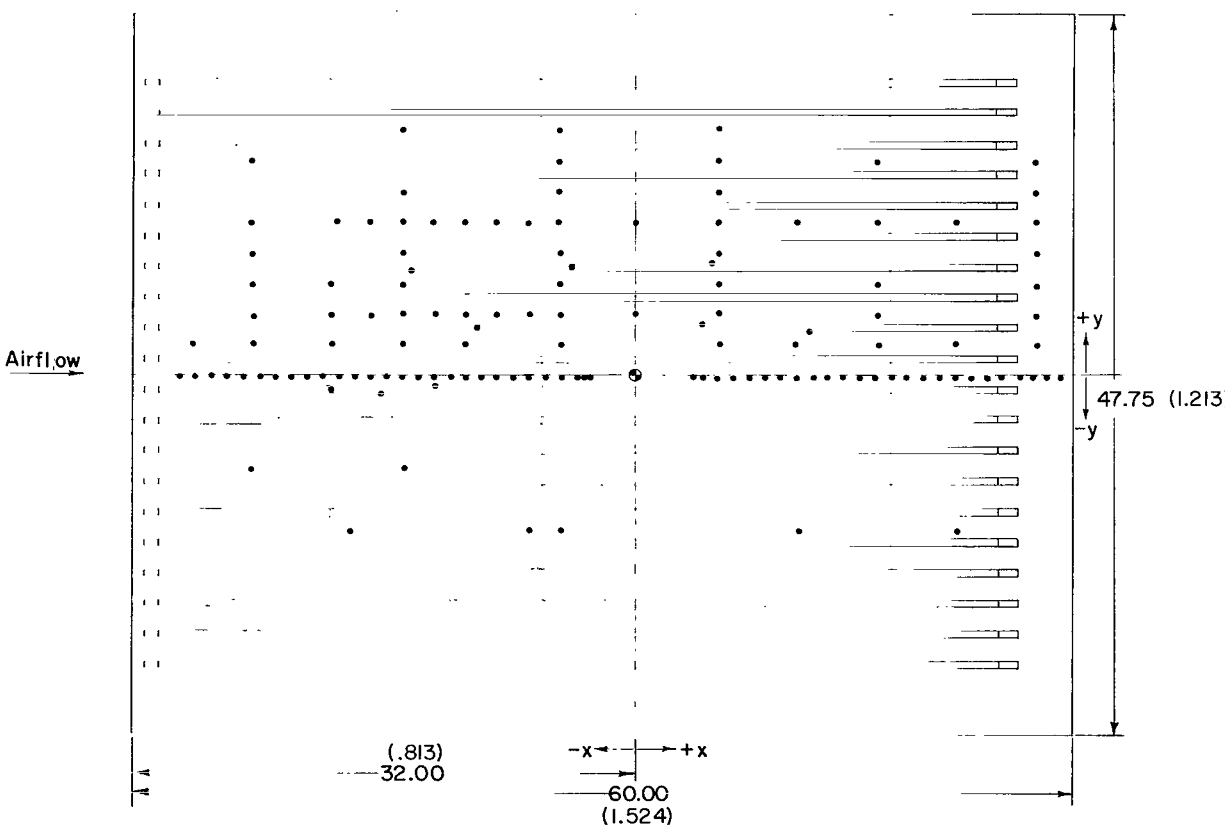


Figure 2.- Dimensions of and instrumentation locations on flat plate. Dimensions are in inches (meters). L-64-2590

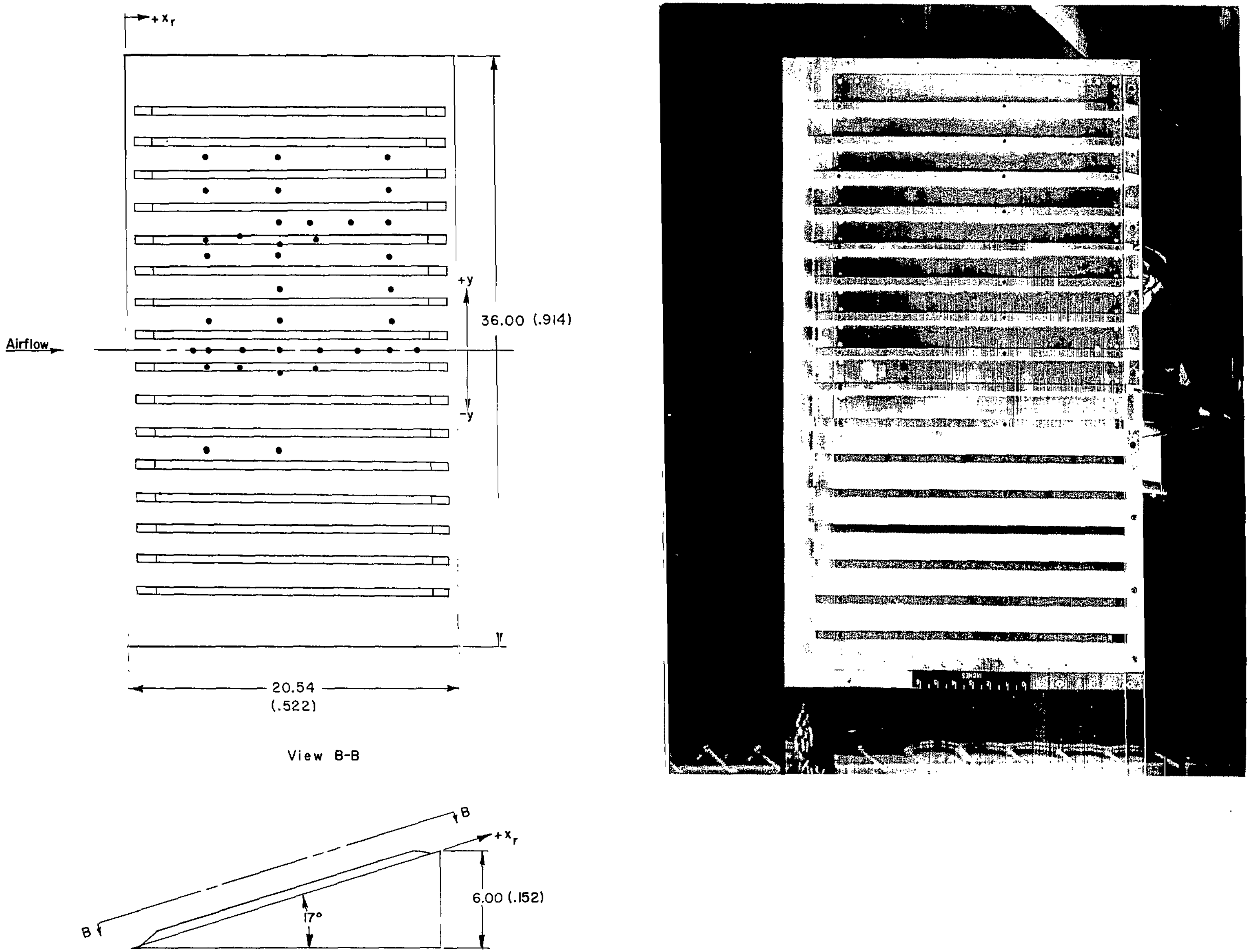


Figure 3.- Dimensions of and instrumentation locations on ramp. Dimensions are in inches (meters).

L-64-2598

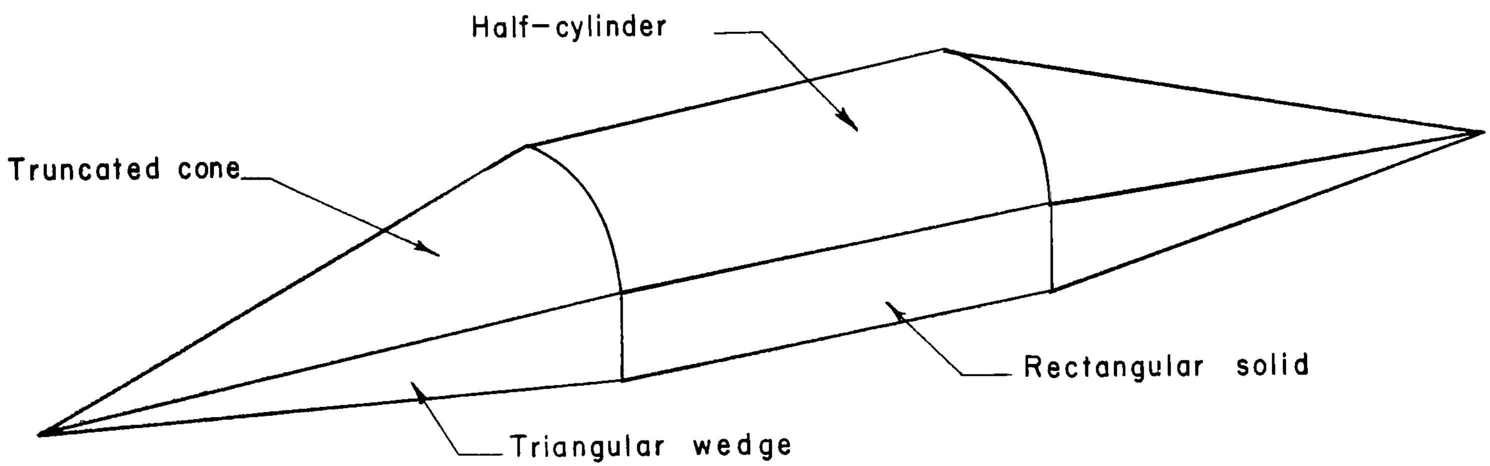


Figure 4.- General protuberance shape.

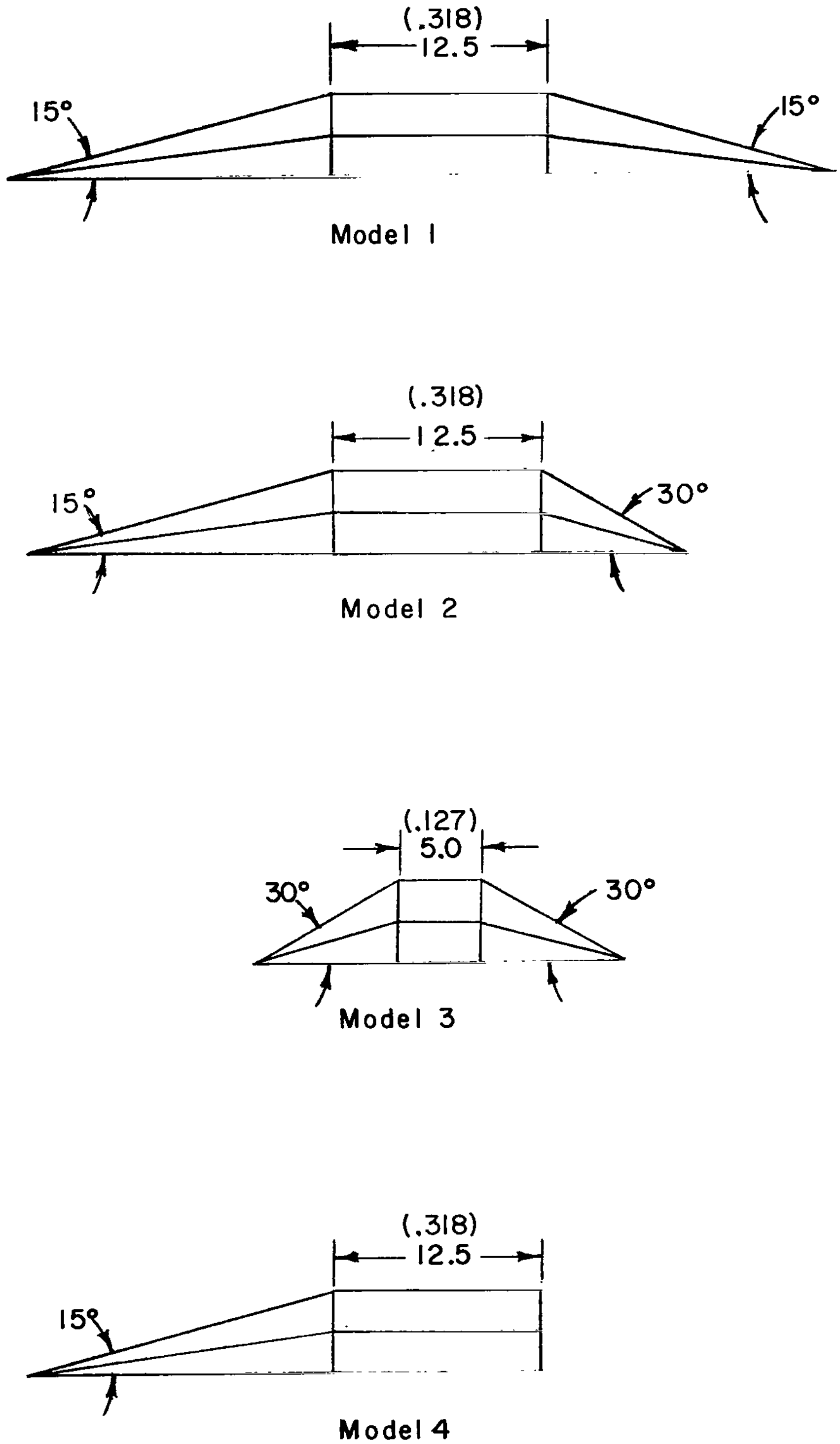
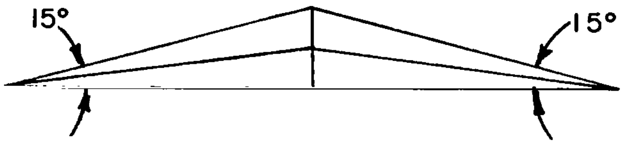
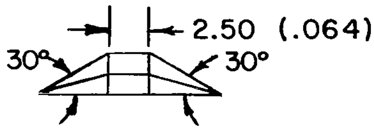


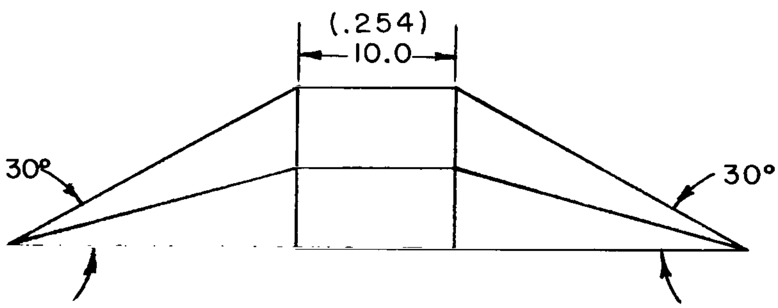
Figure 5.- Relative sizes and basic dimensions of general protuberance models. Dimensions are in inches (meters).



Model 5

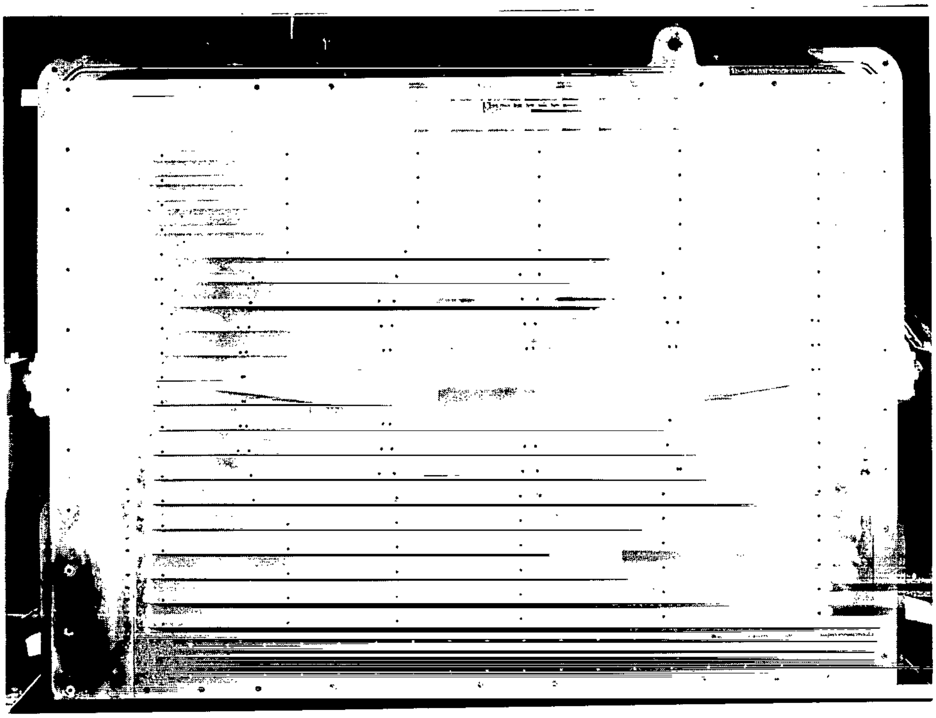


Model 6

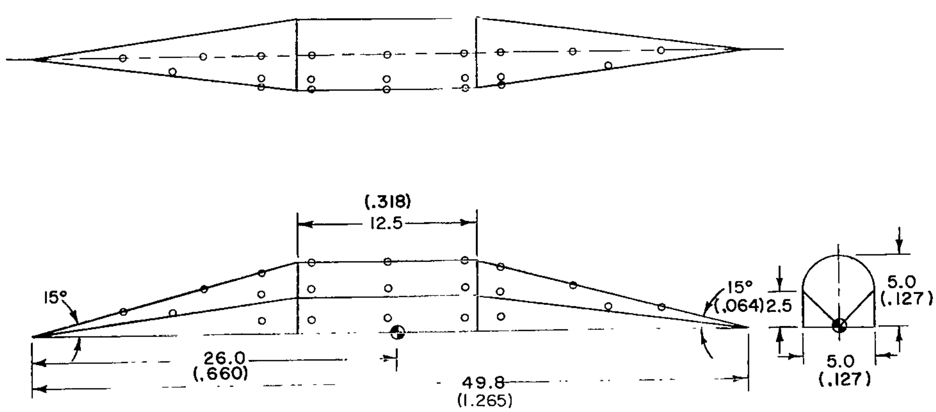


Model 7

Figure 5.- Concluded.



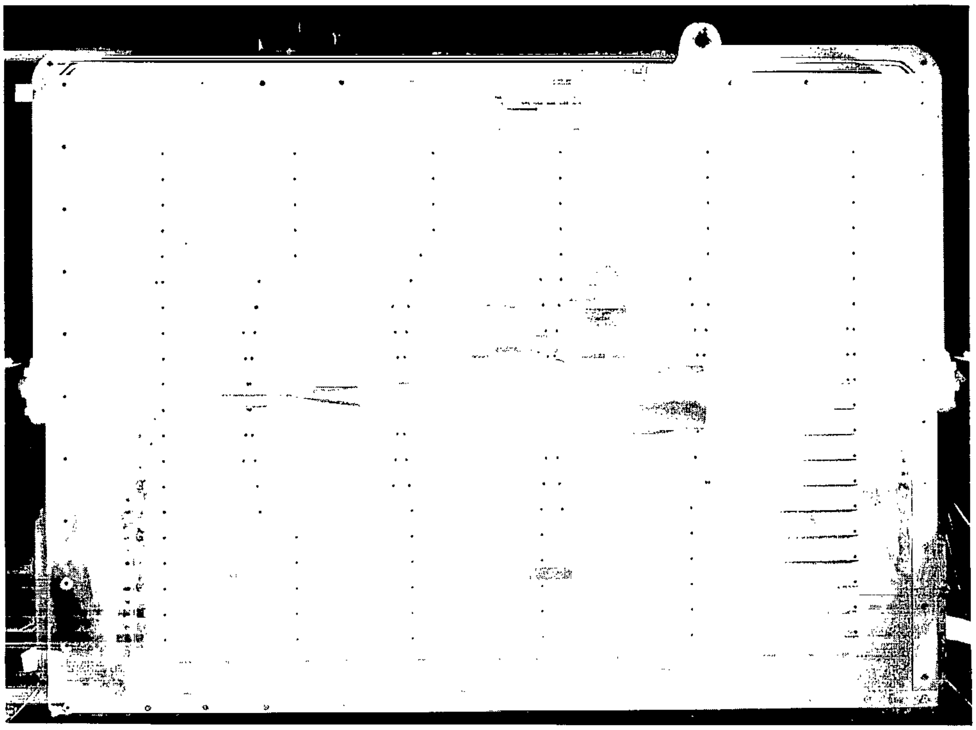
Airflow



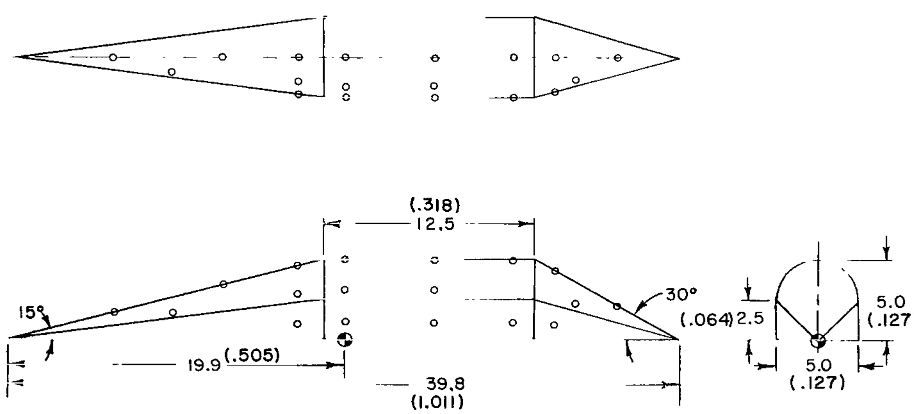
(a) Model 1.

L-64-2599

Figure 6.- Dimensions of and instrumentation locations on models. Dimensions are in inches (meters).



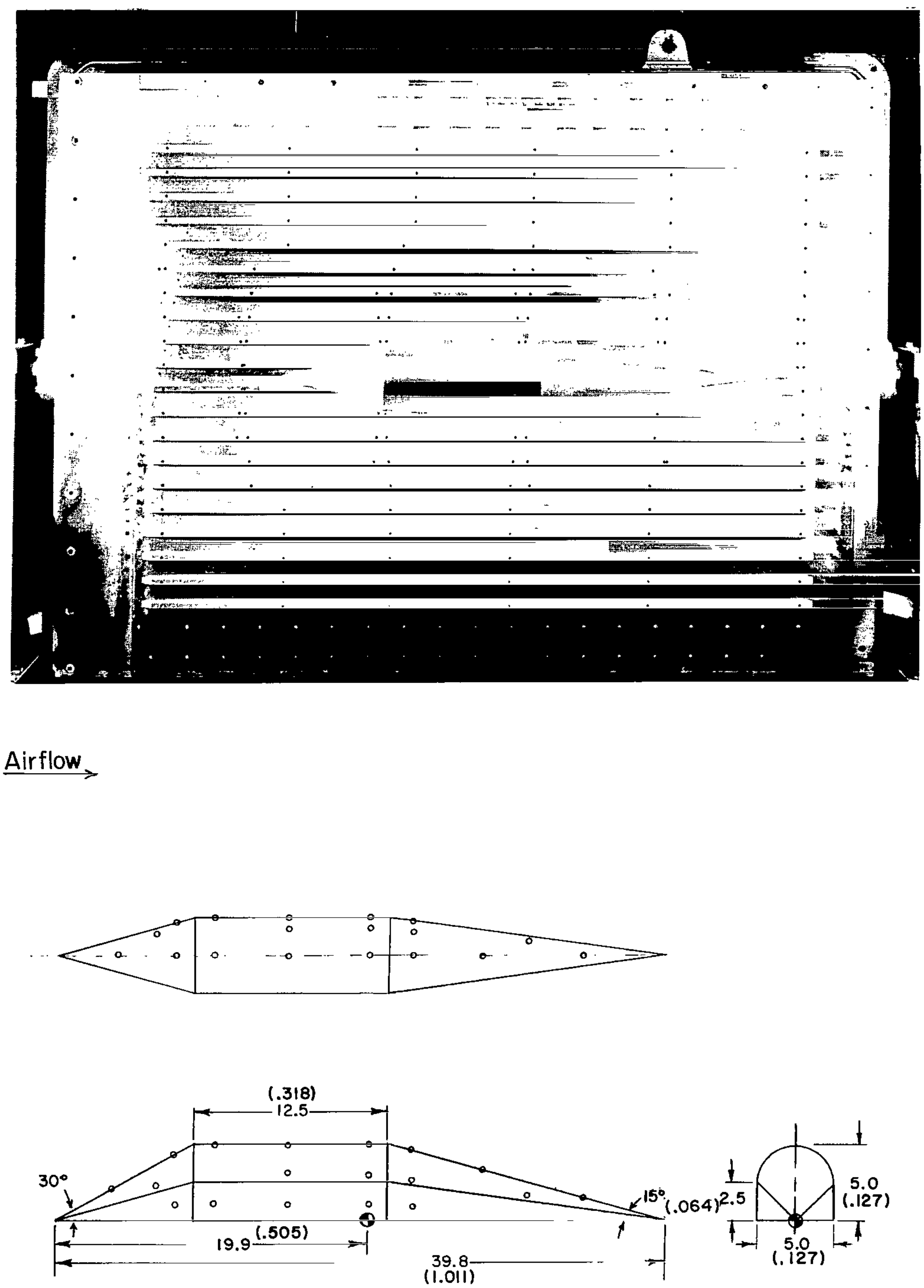
Airflow



(b) Model 2.

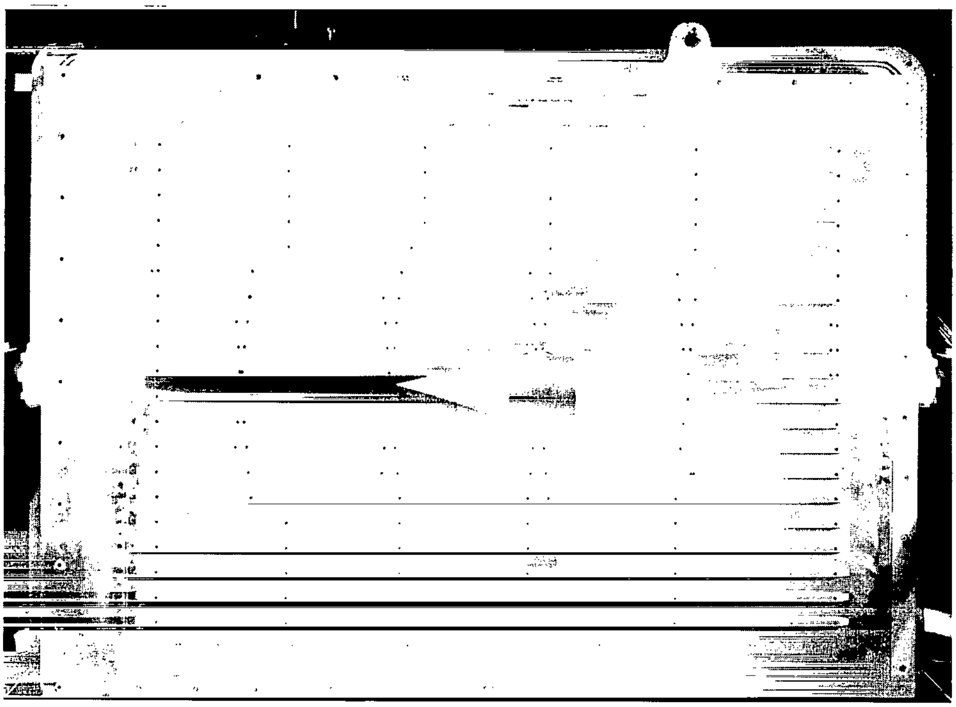
L-64-2585

Figure 6.- Continued.

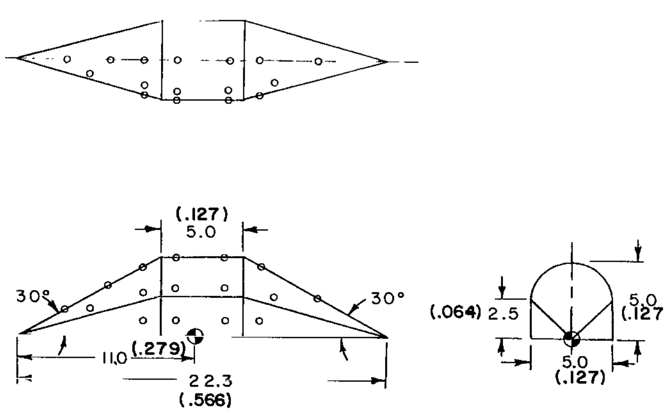


(c) Model 2 reversed. L-64-2586

Figure 6.- Continued.



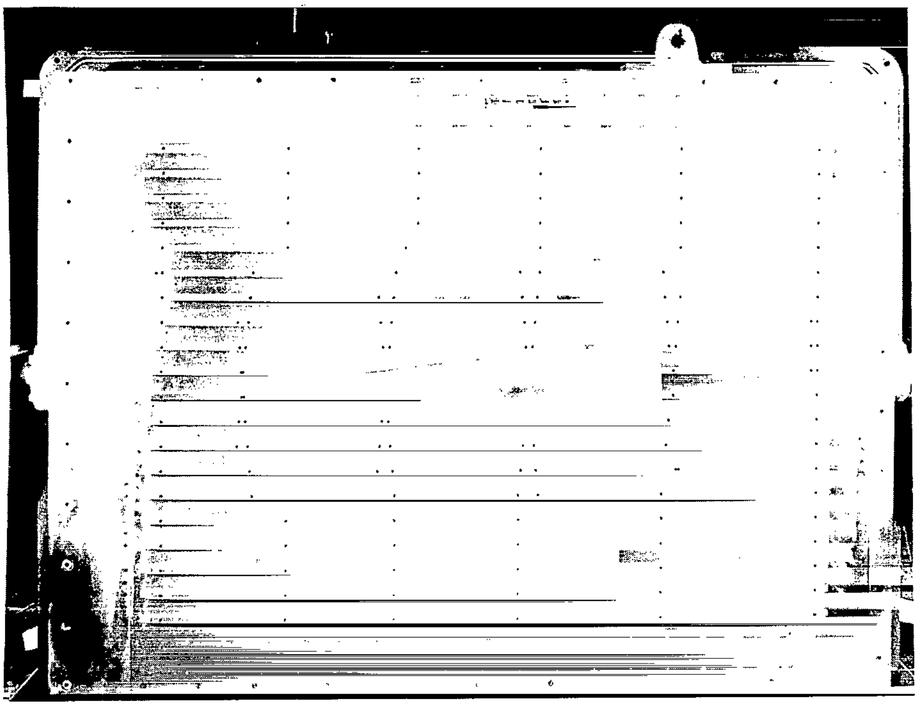
Airflow

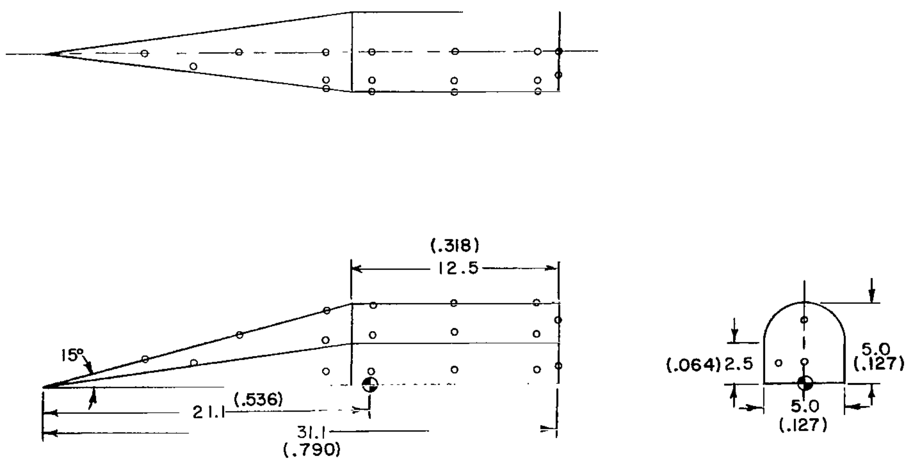


(d) Model 3.

L-64-2587

Figure 6.- Continued.

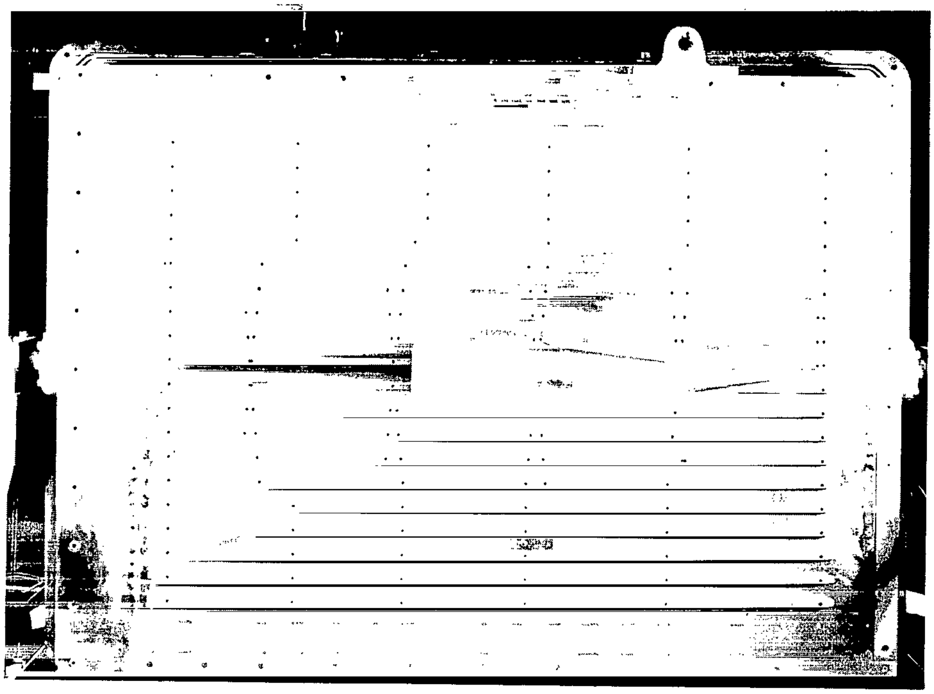




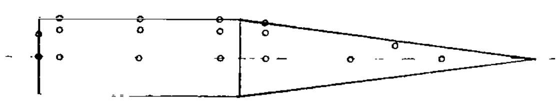
(e) Model 4.

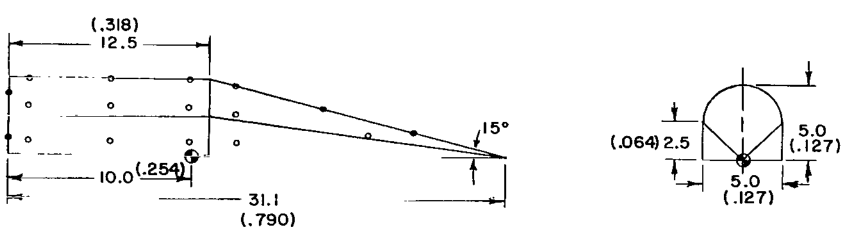
L-64-2601

Figure 6.- Continued.



Airflow

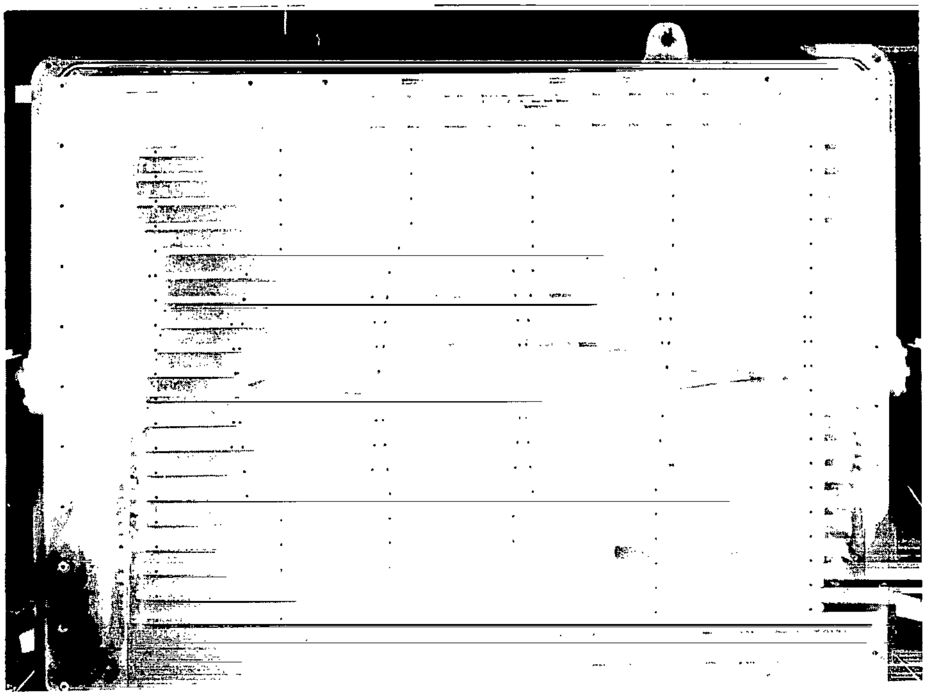




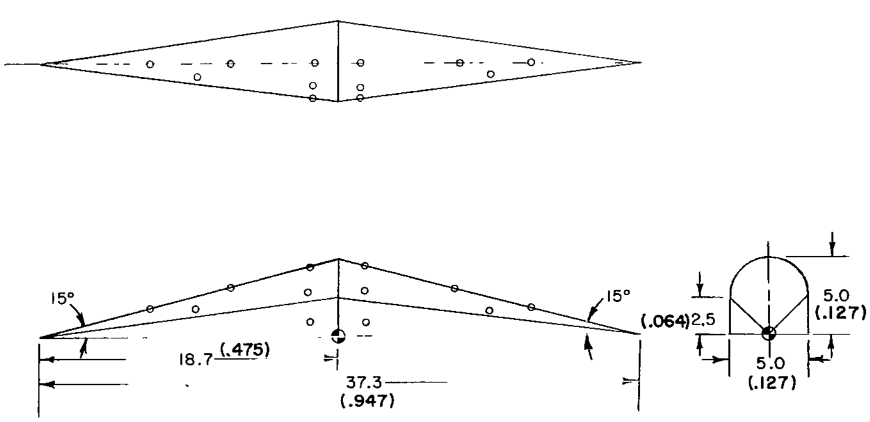
(f) Model 4 reversed.

L-64-2595

Figure 6.- Continued.



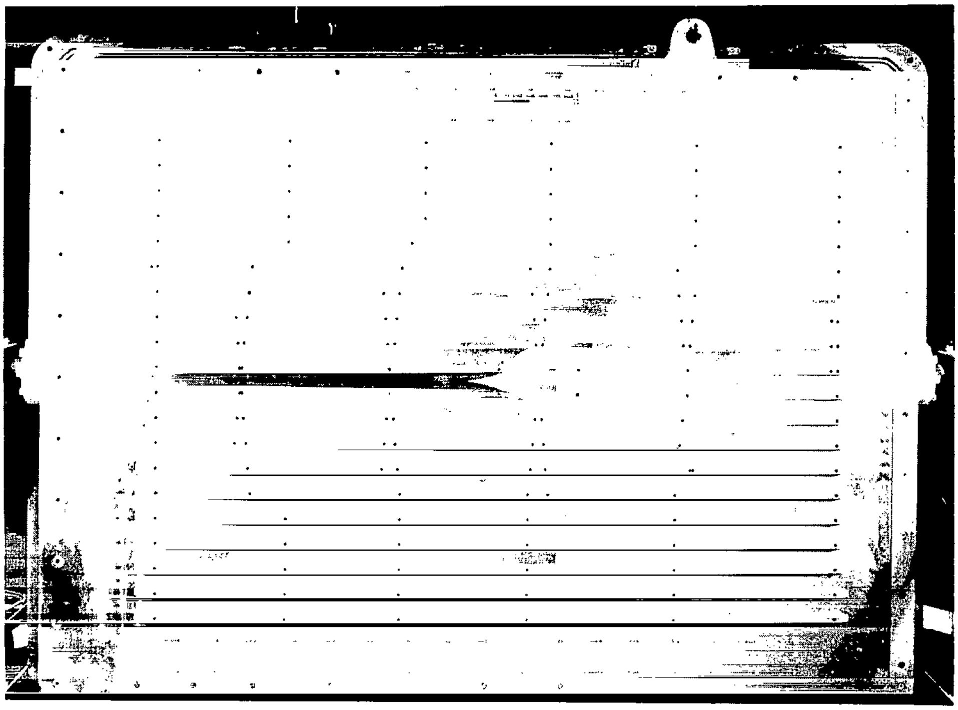
Airflow



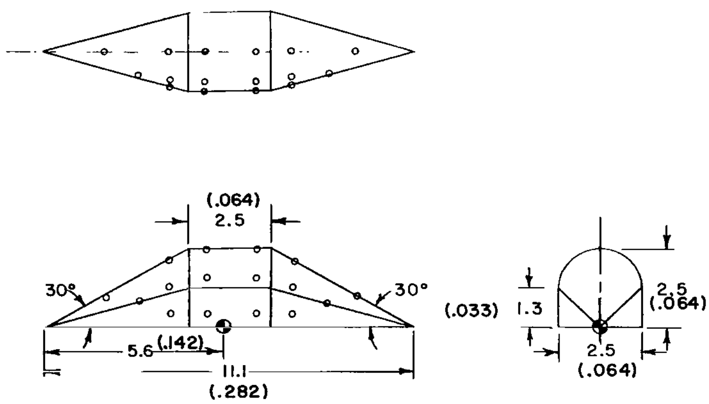
(g) Model 5.

L-64-2584

Figure 6.- Continued.



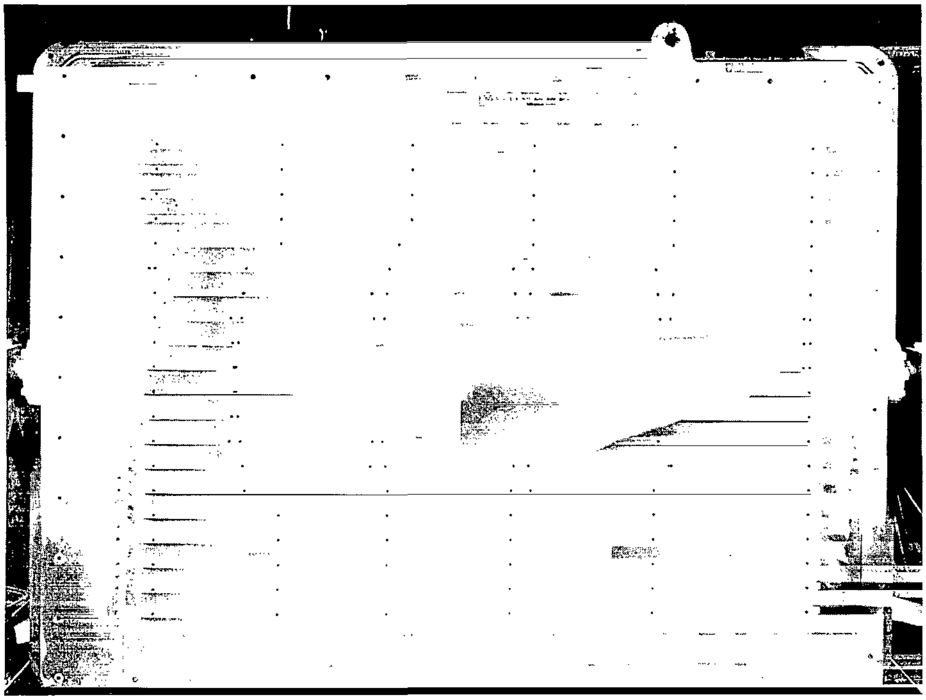
Airflow



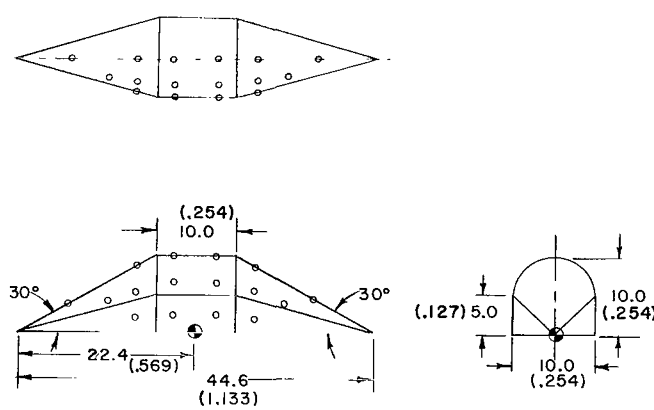
(h) Model 6.

L-64-2588

Figure 6.- Continued.



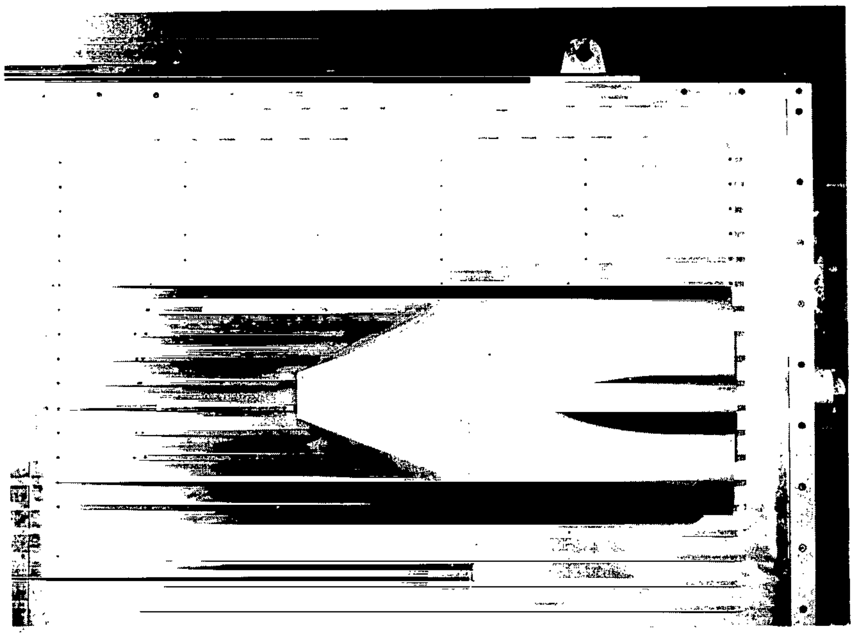
Airflow

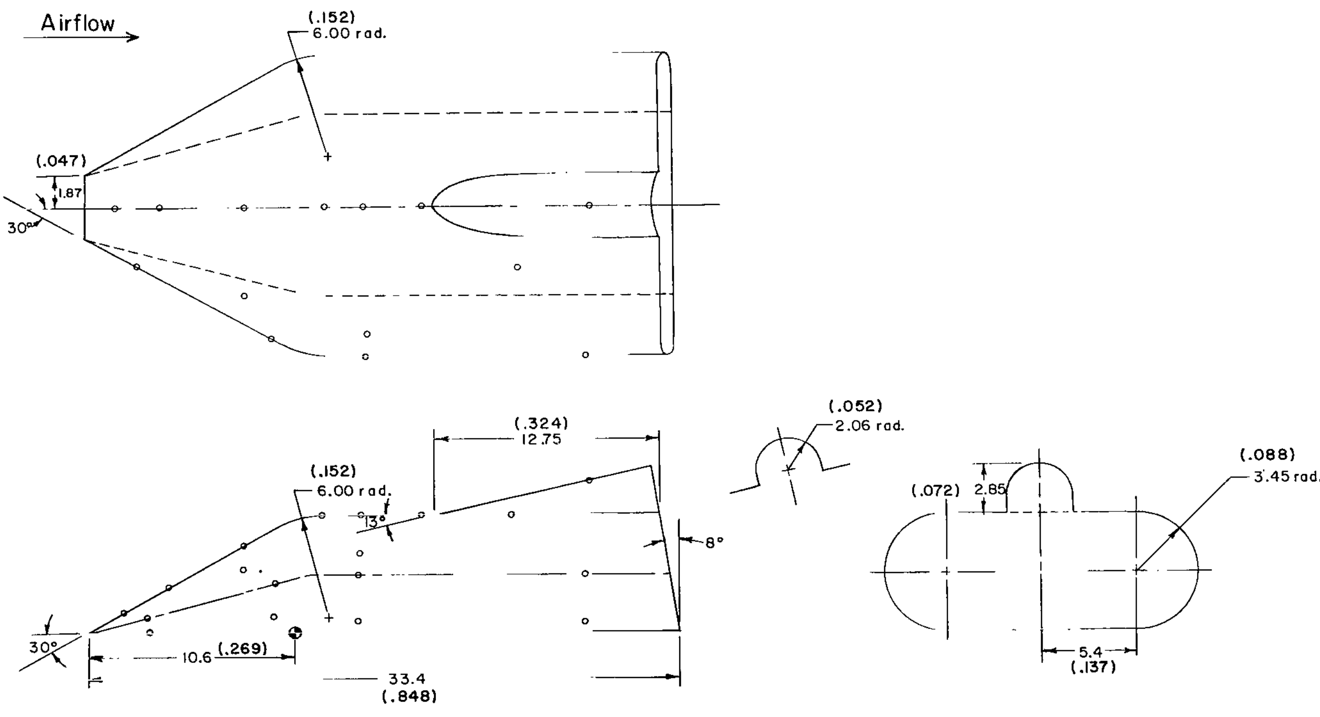


(i) Model 7.

L-64-2600

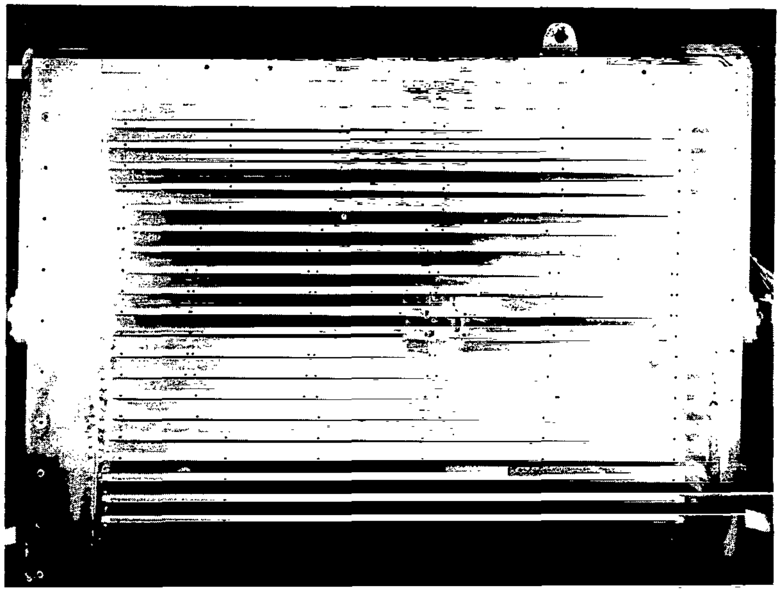
Figure 6.- Continued.

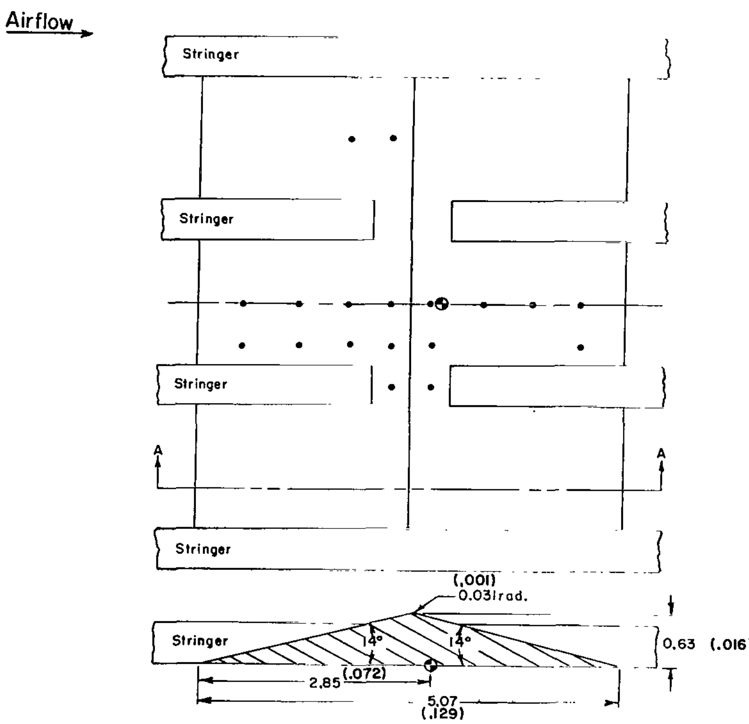




(j) Model 8. L-64-2765

Figure 6.- Continued.



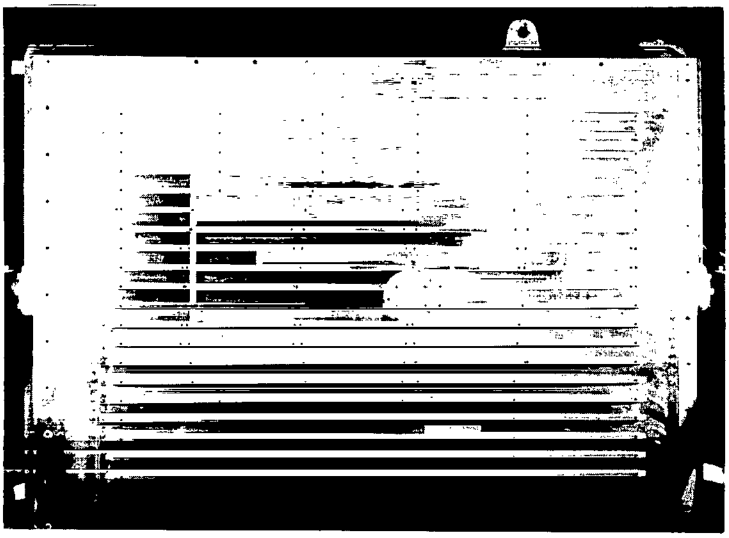


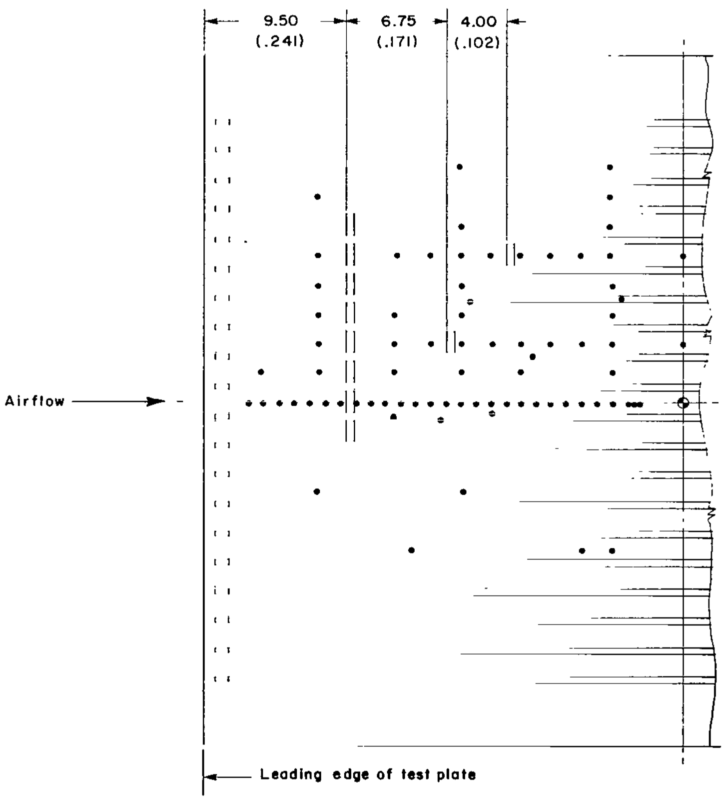
View A-A

(k) Model 9.

L-64-2596

Figure 6.- Continued.





(l) Model 10.

L-64-2591

Figure 6.- Concluded.

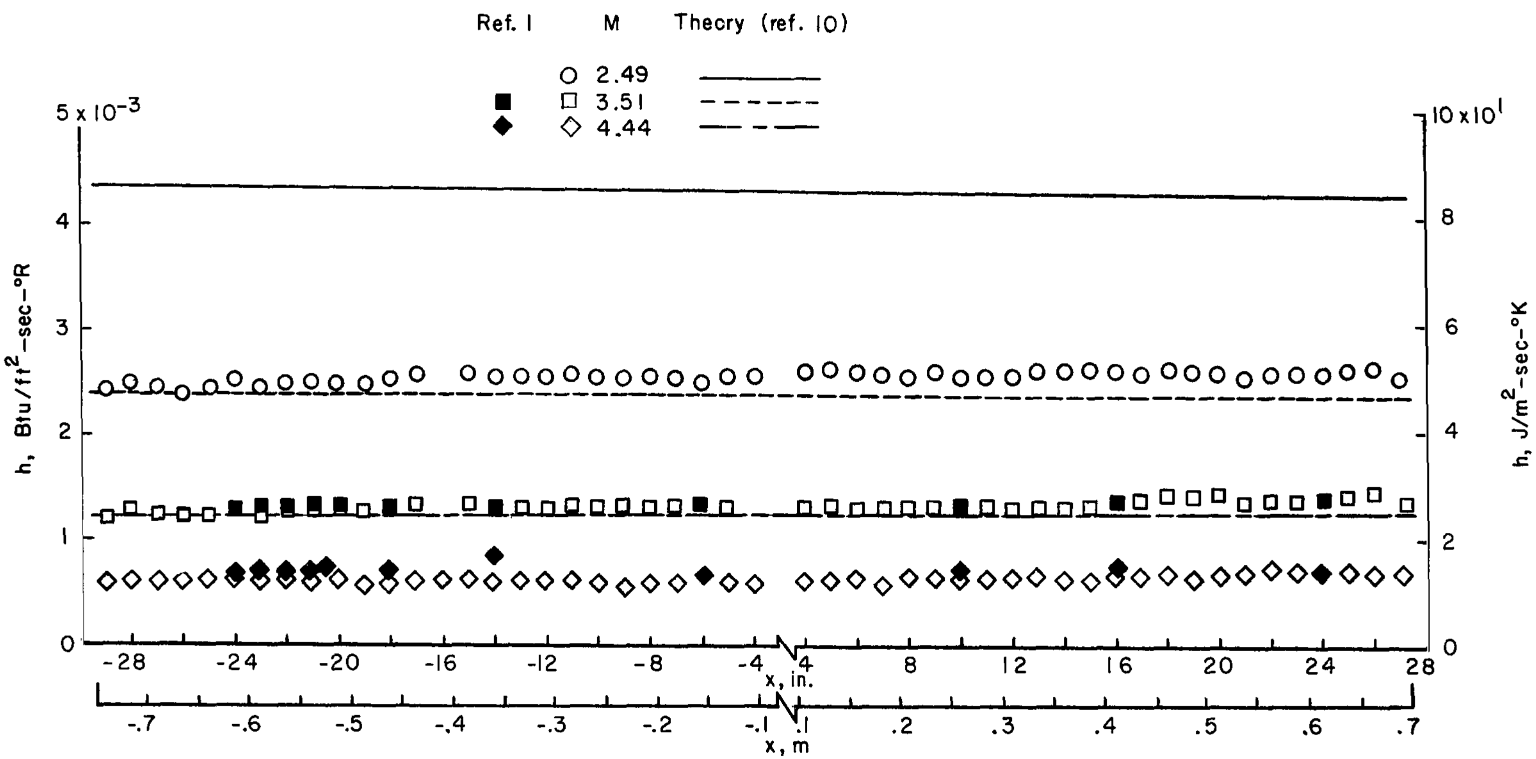


Figure 7.- Effect of Mach number on flat-plate heating distribution. Configuration 1.

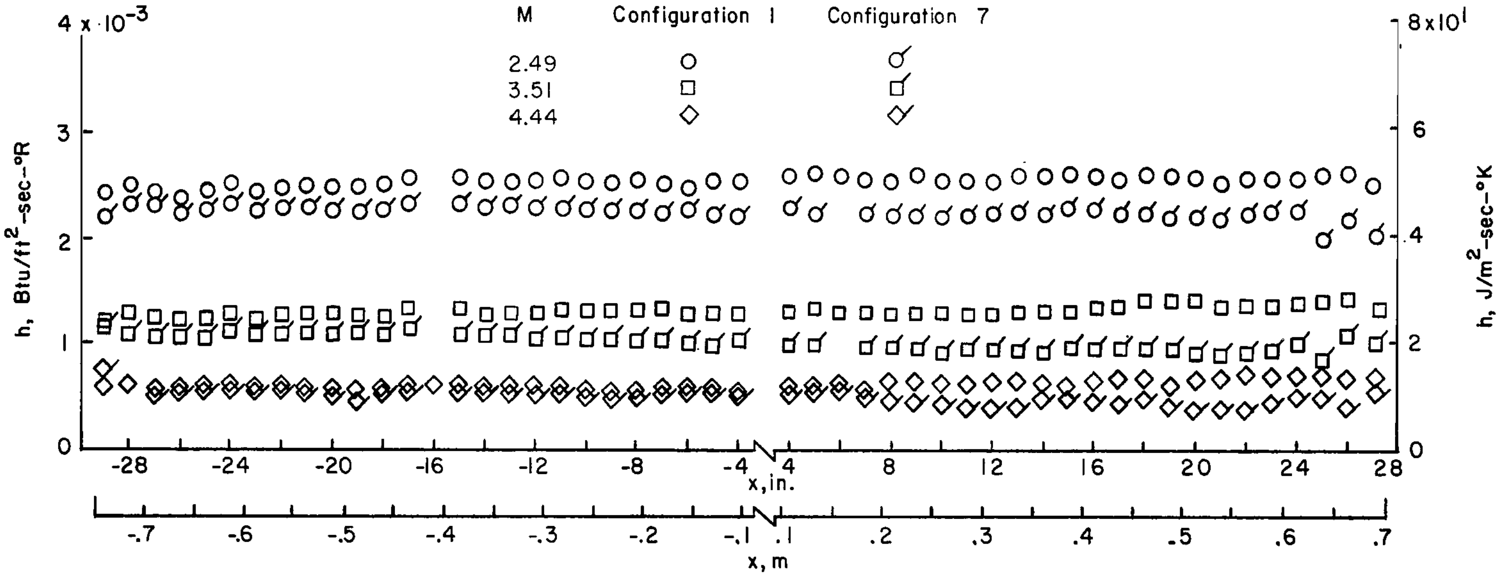
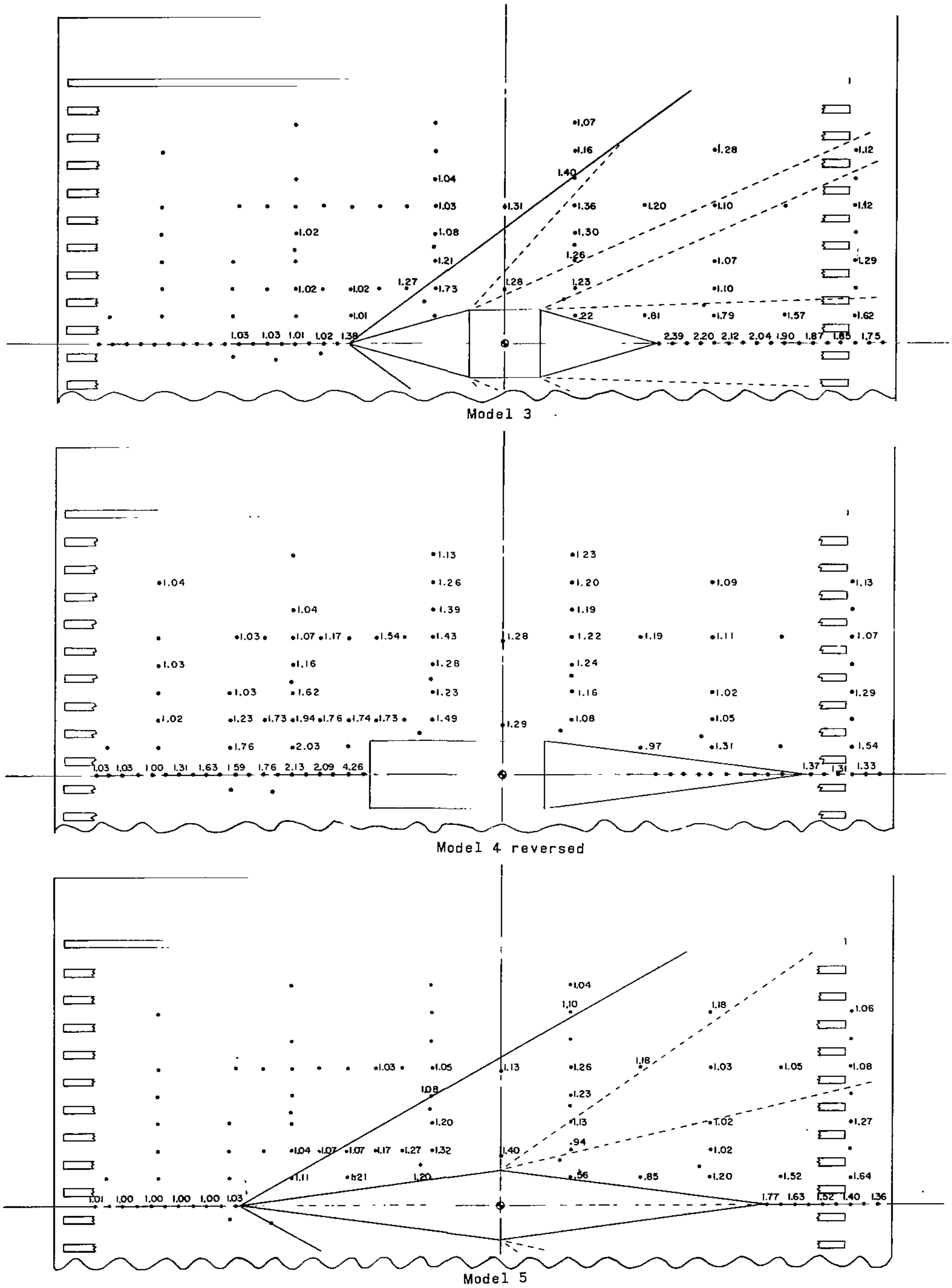
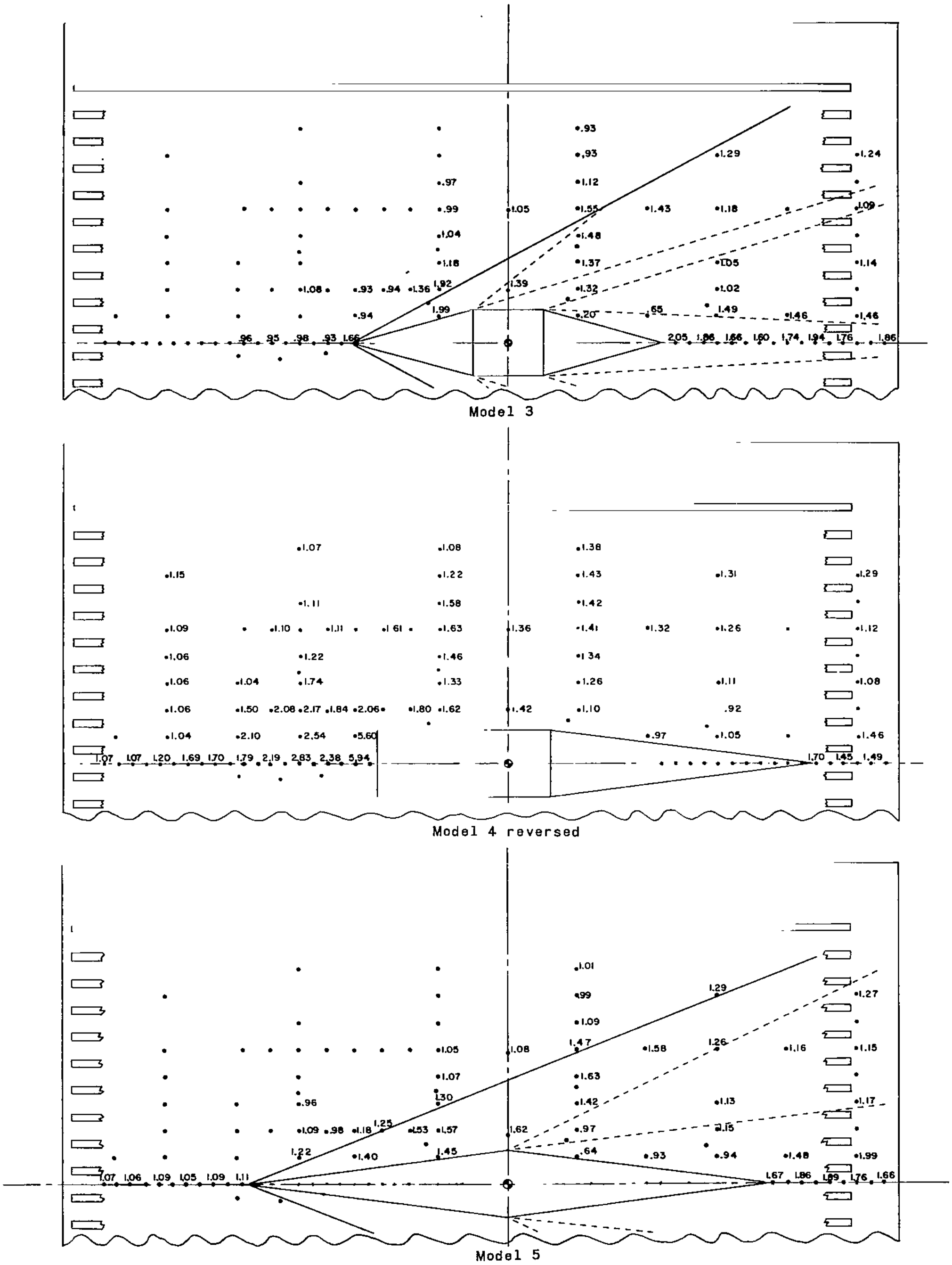


Figure 8.- Effect of stringers on flat-plate heating distribution.



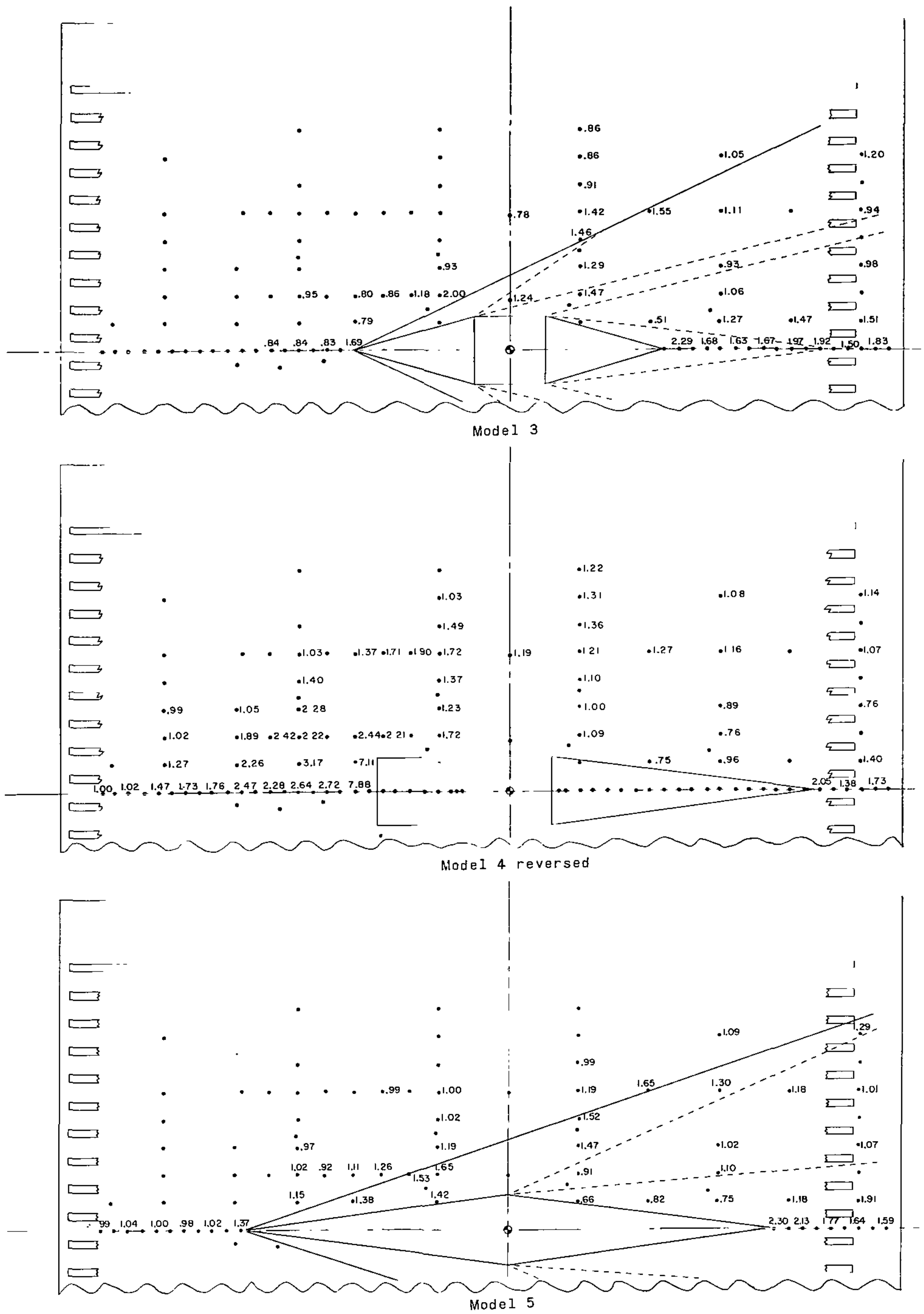
(a) M = 2.49.

Figure 9.- Spatial plots of effect of model geometry on flat-plate heating distribution. (Values presented are ratios of heating rates obtained on plate with model attached to those obtained on clean plate.)



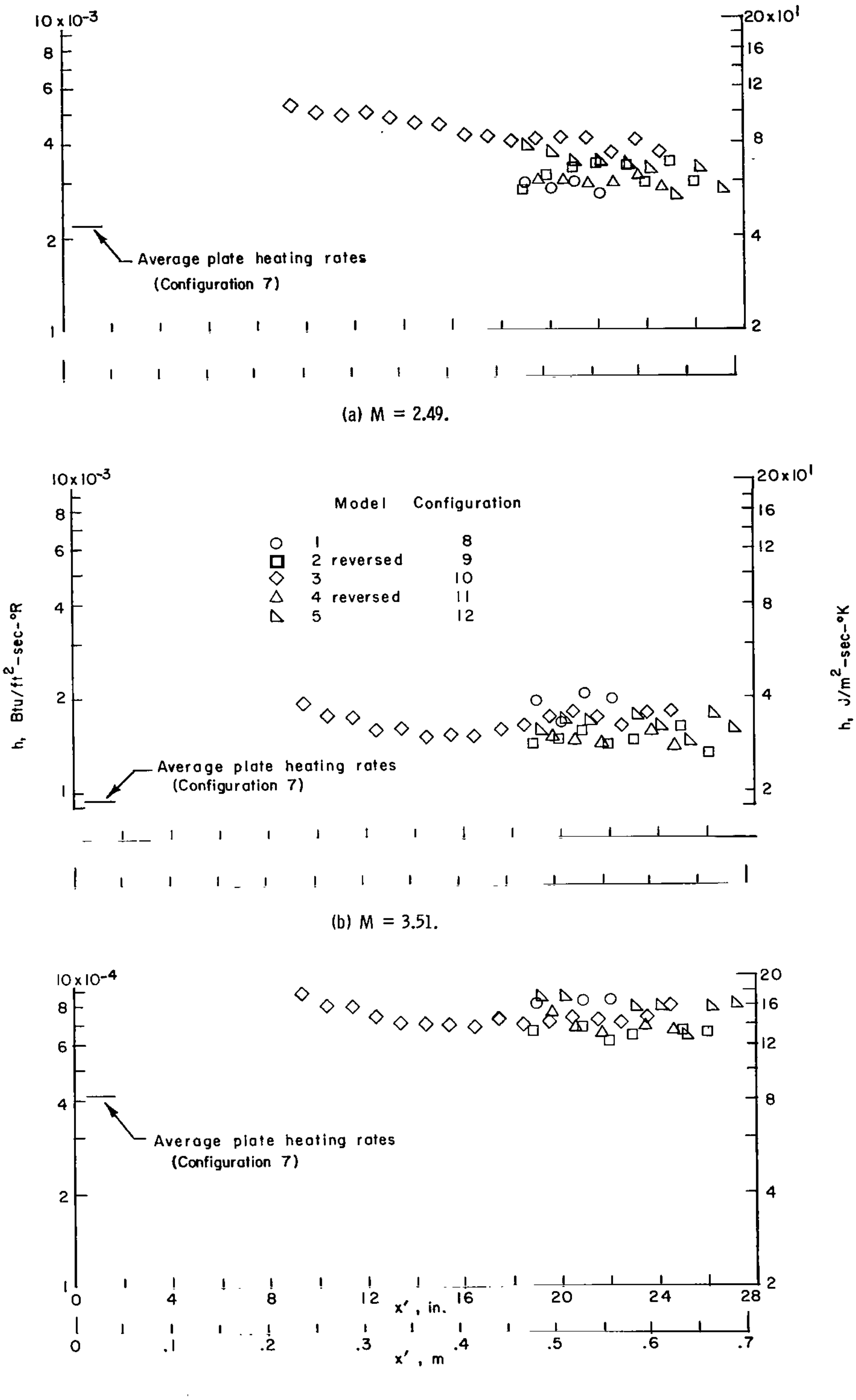
(b) M = 3.51.

Figure 9.- Continued.



(c) M = 4.44.

Figure 9.- Concluded.



(a) M = 2.49.

(b) M = 3.51.

(c) M = 4.44.

Figure 10.- Effect of model geometry on flat-plate heating distribution in model wake. $0 < x \leqq 27$ in. (0.686 m) and $y = 0$ in.

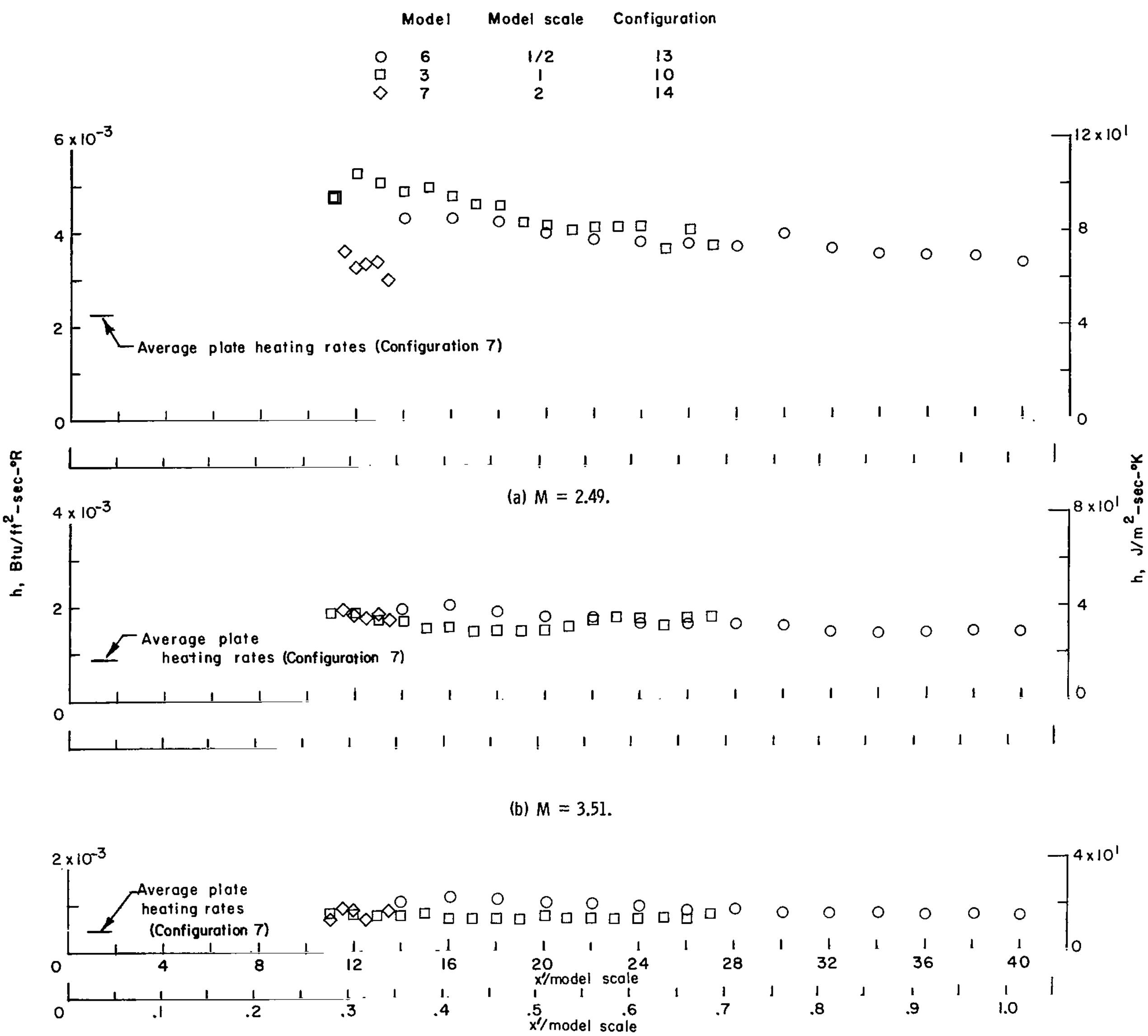
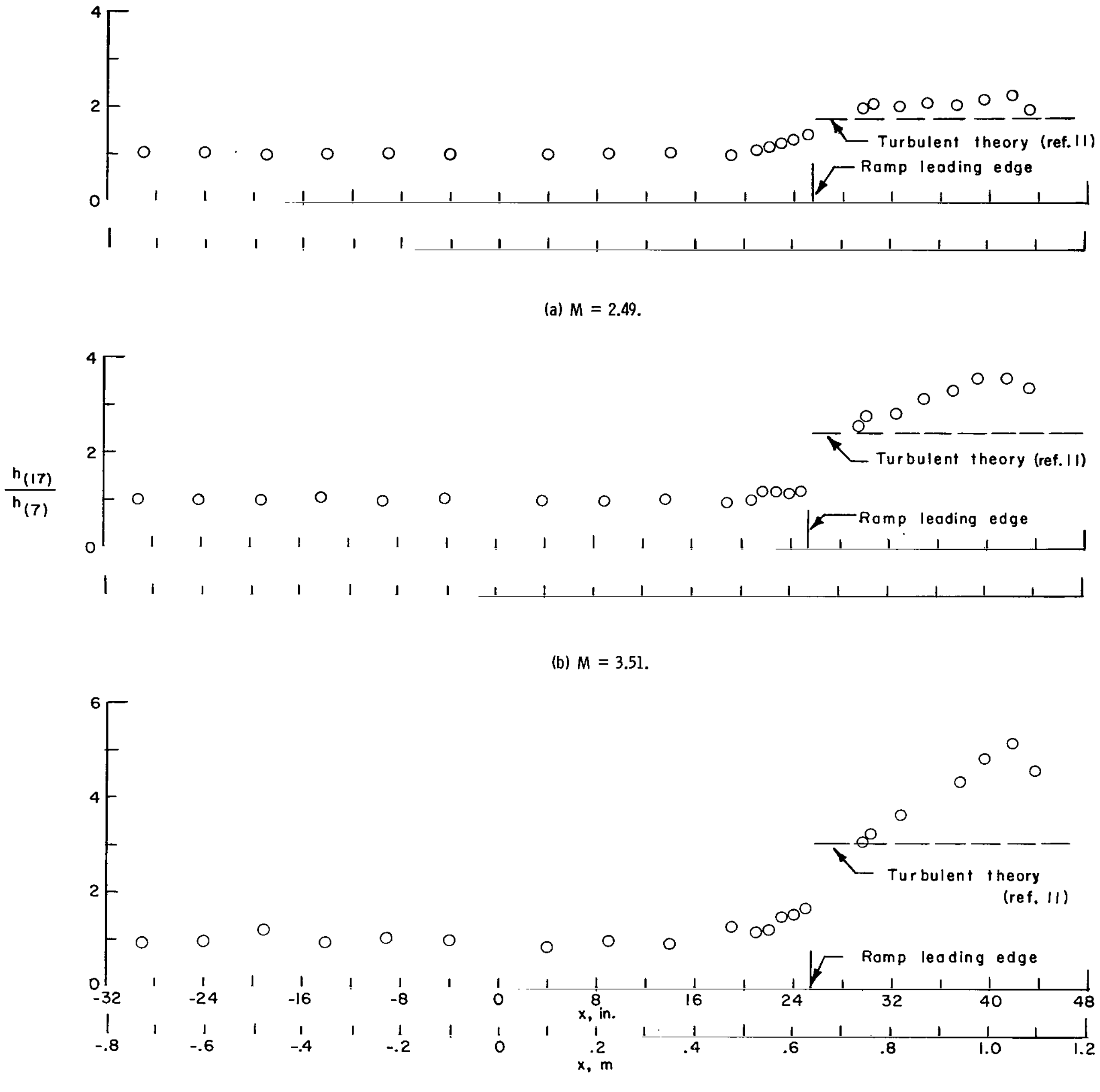
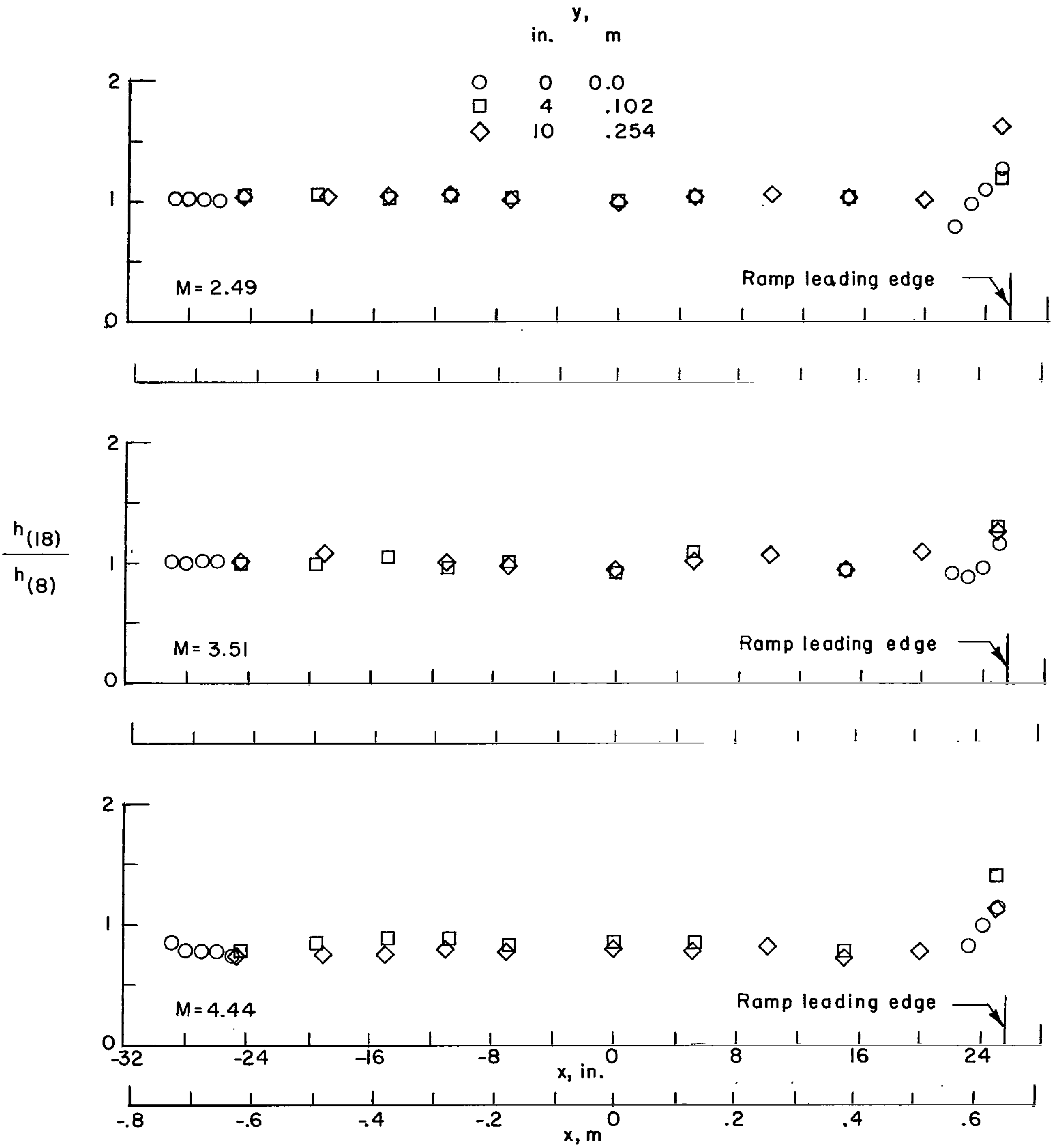


Figure 11.- Effect of model scale on flat-plate heating distribution in model wake. $0 < x \leqq 27$ in. (0.686 m) and $y = 0$ in.



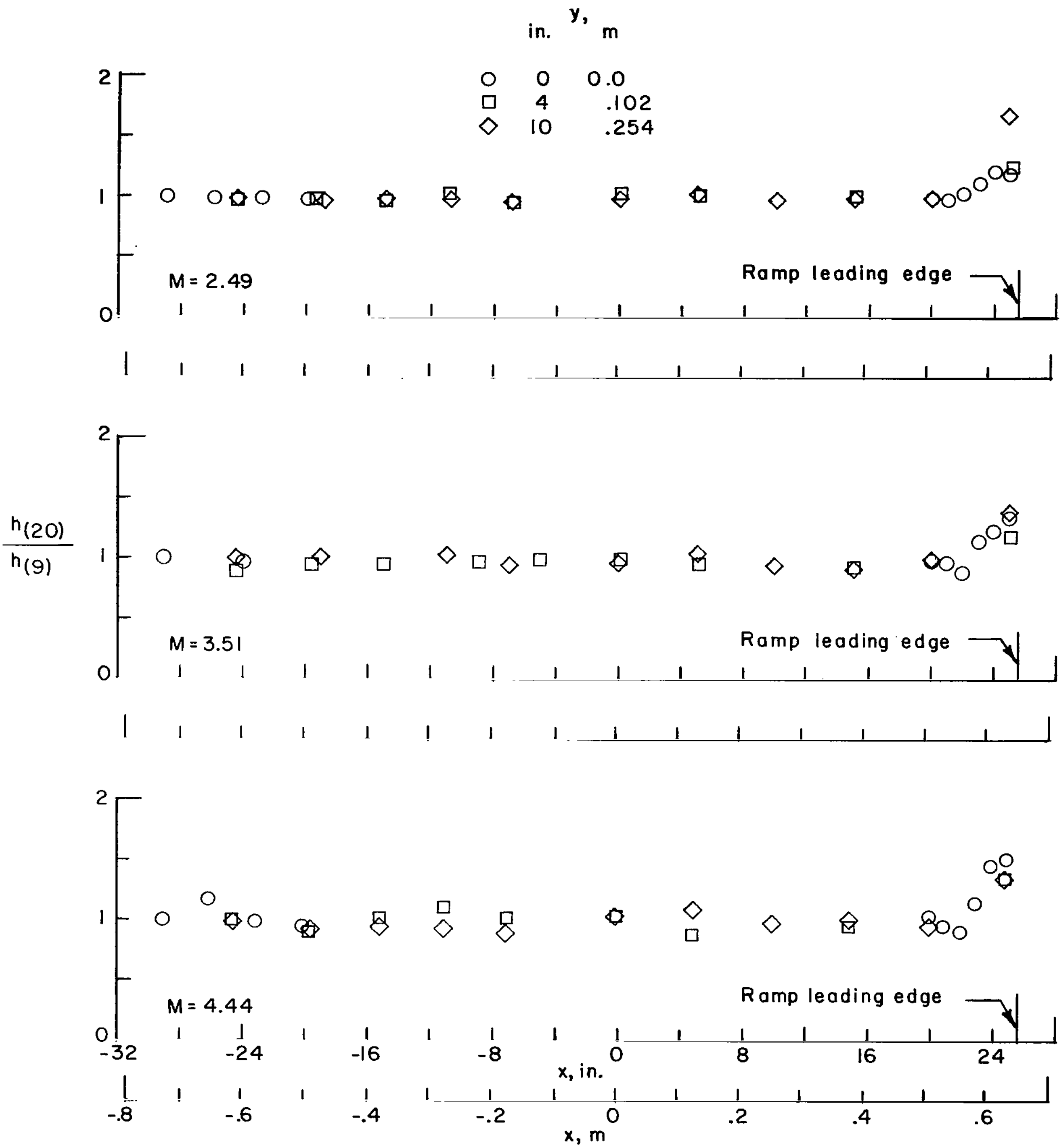
(c) M = 4.44.

Figure 12.- Effect of ramp on flat-plate heating distribution. $0 < x \leqq 27$ in. (0.686 m) and $y = 0$ in. (Heating rates for ramp are divided by average value of heating rates for configuration 7.)



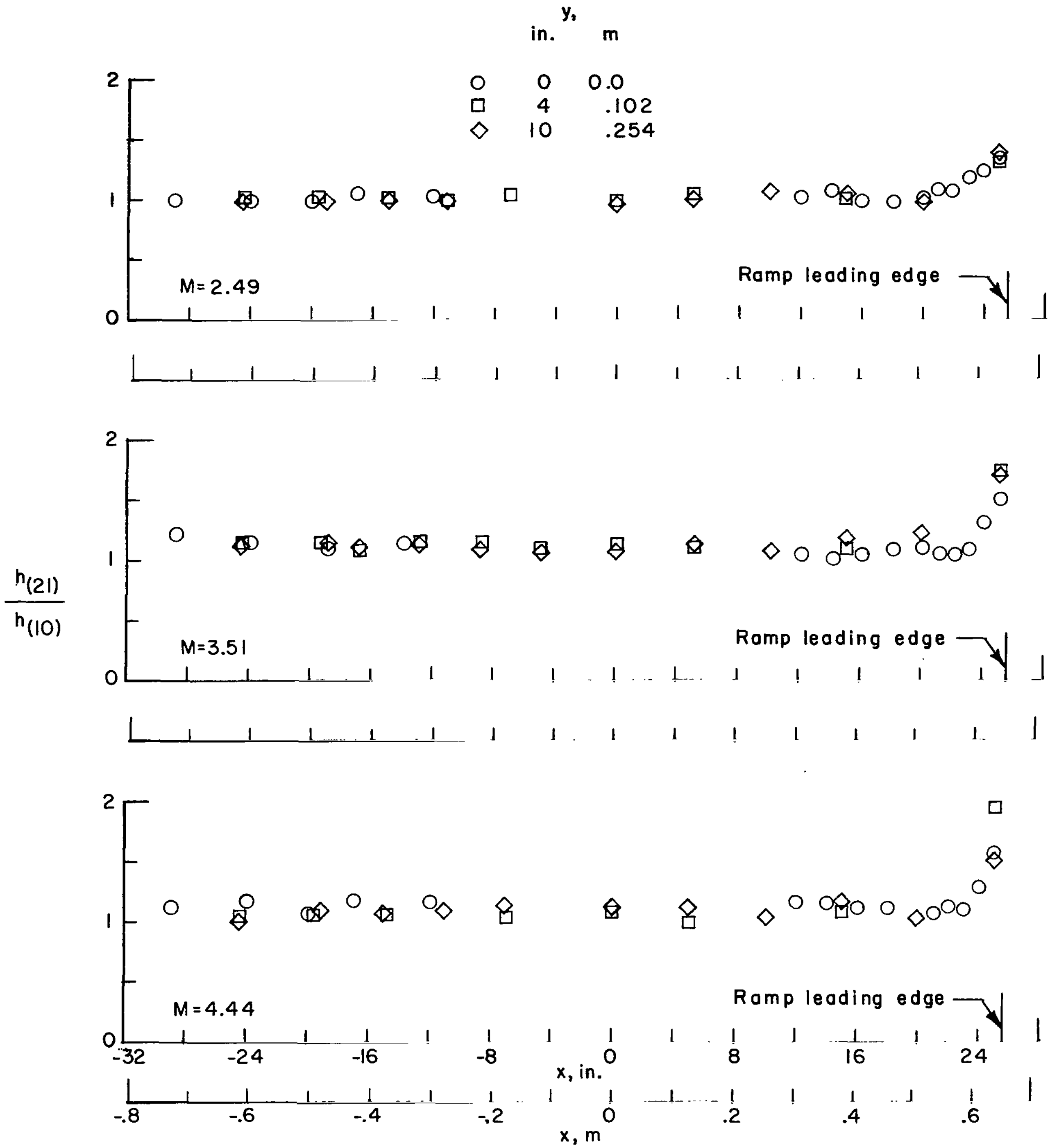
(a) Model 1 (configuration 18).

Figure 13.- Effect of ramp on heating distribution of flat plate with models.



(b) Model 2 reversed (configuration 20).

Figure 13.- Continued.



(c) Model 3 (configuration 21).

Figure 13.- Concluded.

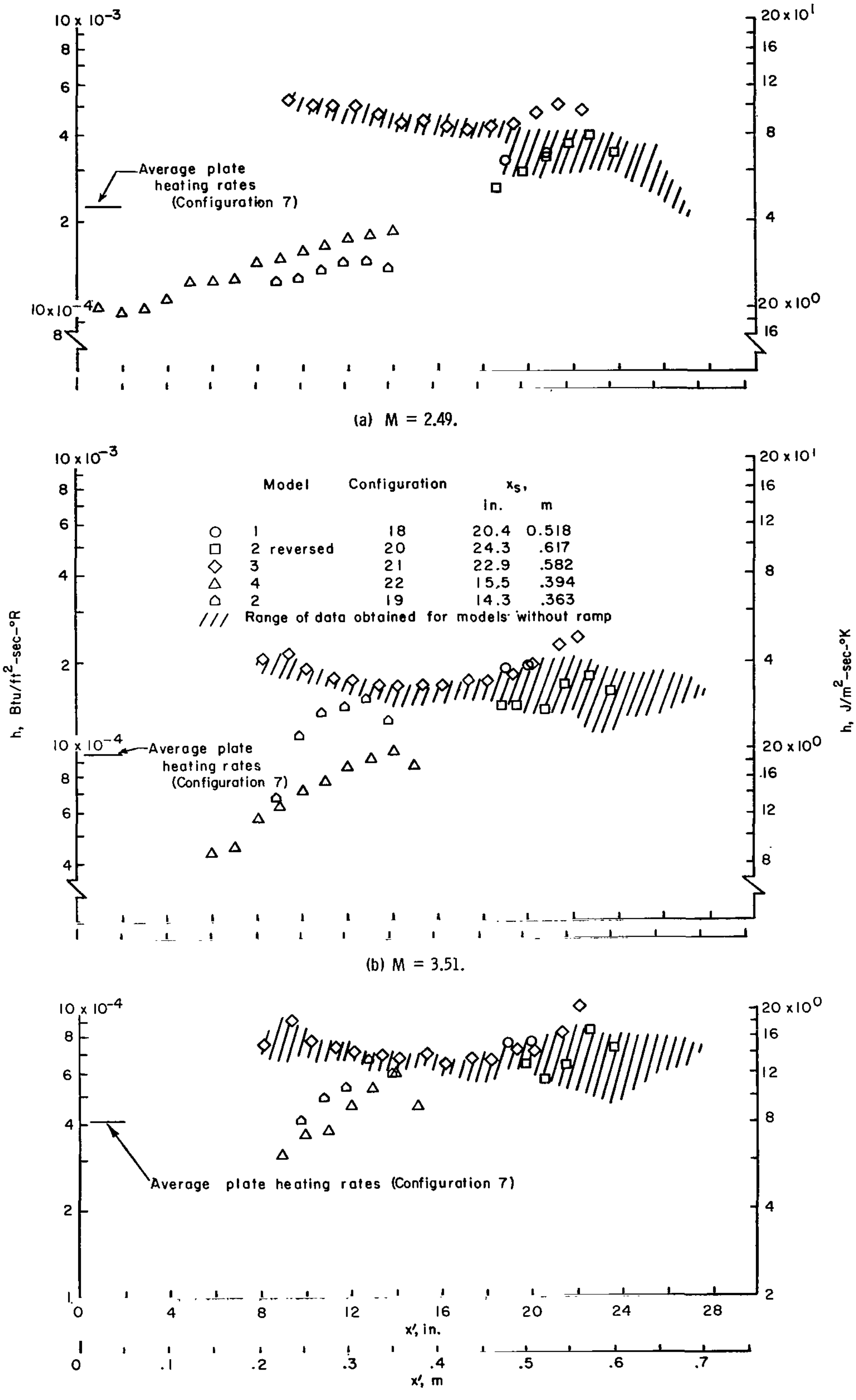
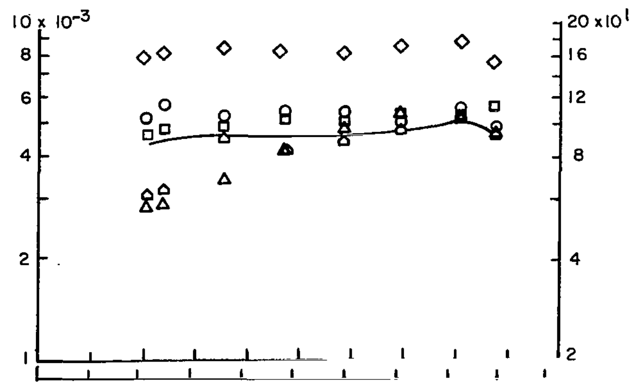
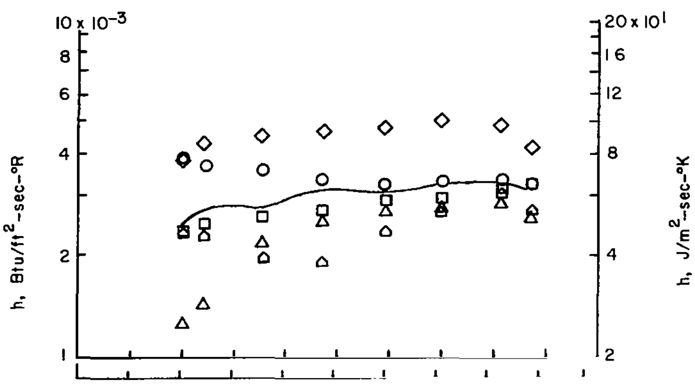


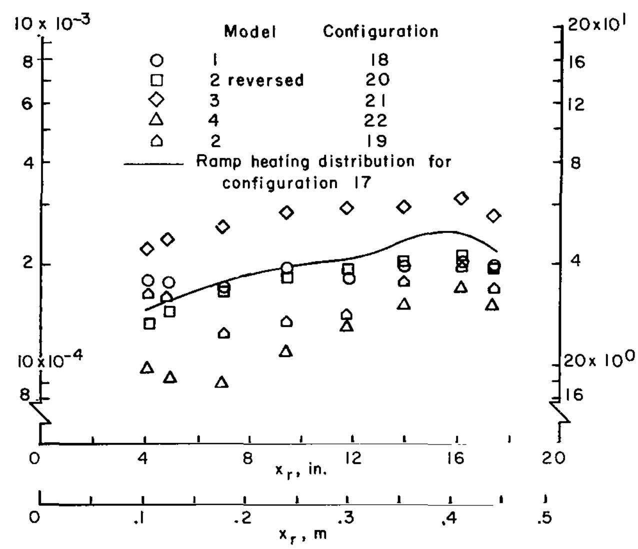
Figure 14.- Heat-transfer measurements obtained on flat-plate surface in model wakes with ramp. $0 < x \leqq 27$ in. (0.686 m) and $y = 0$ in.



(a) M = 2.49.



(b) M = 3.51.



(c) M = 4.44.

Figure 15.- Effect of model wakes on ramp heating distribution.

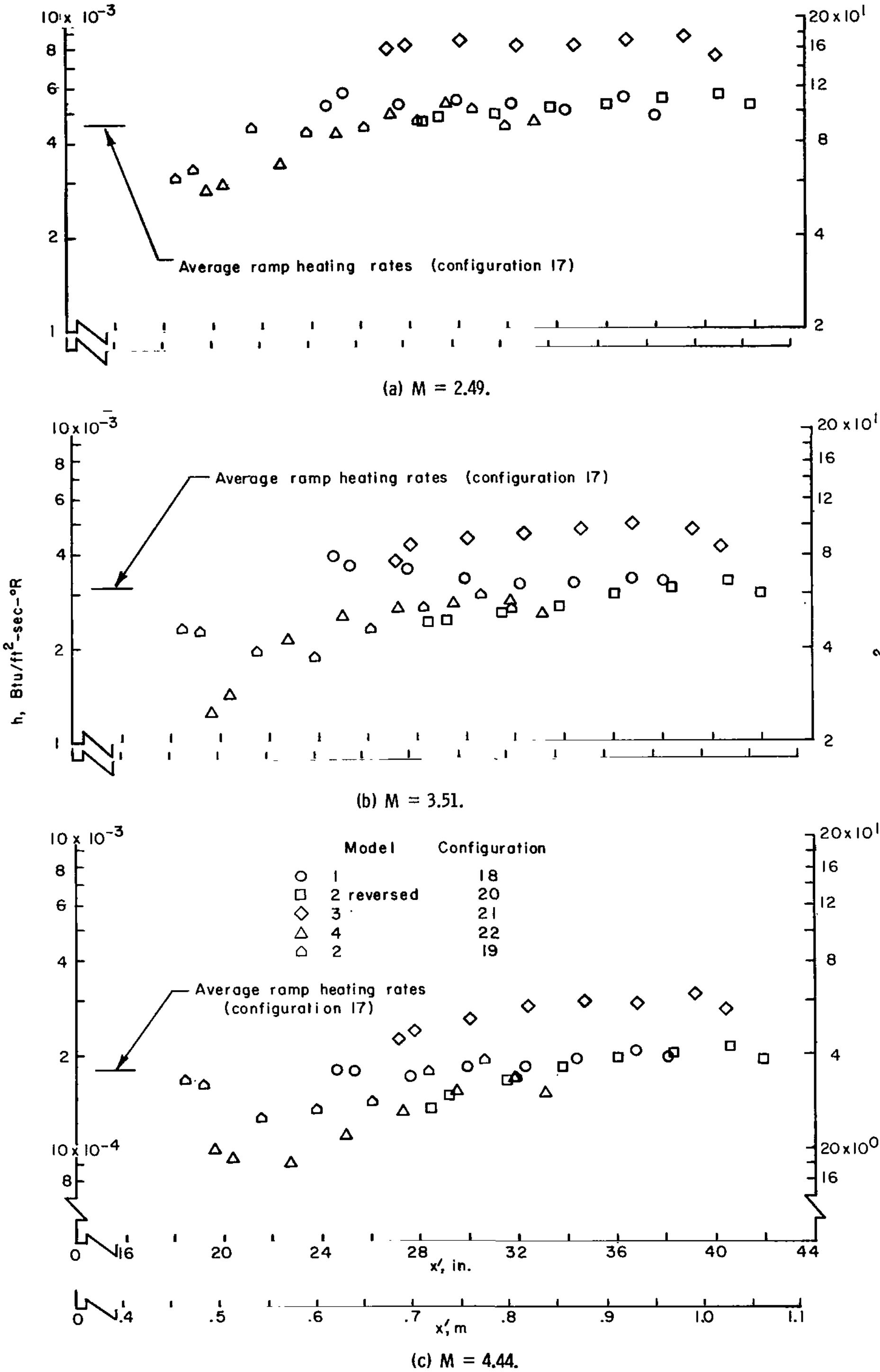


Figure 16.- Correlation of ramp heating distribution.

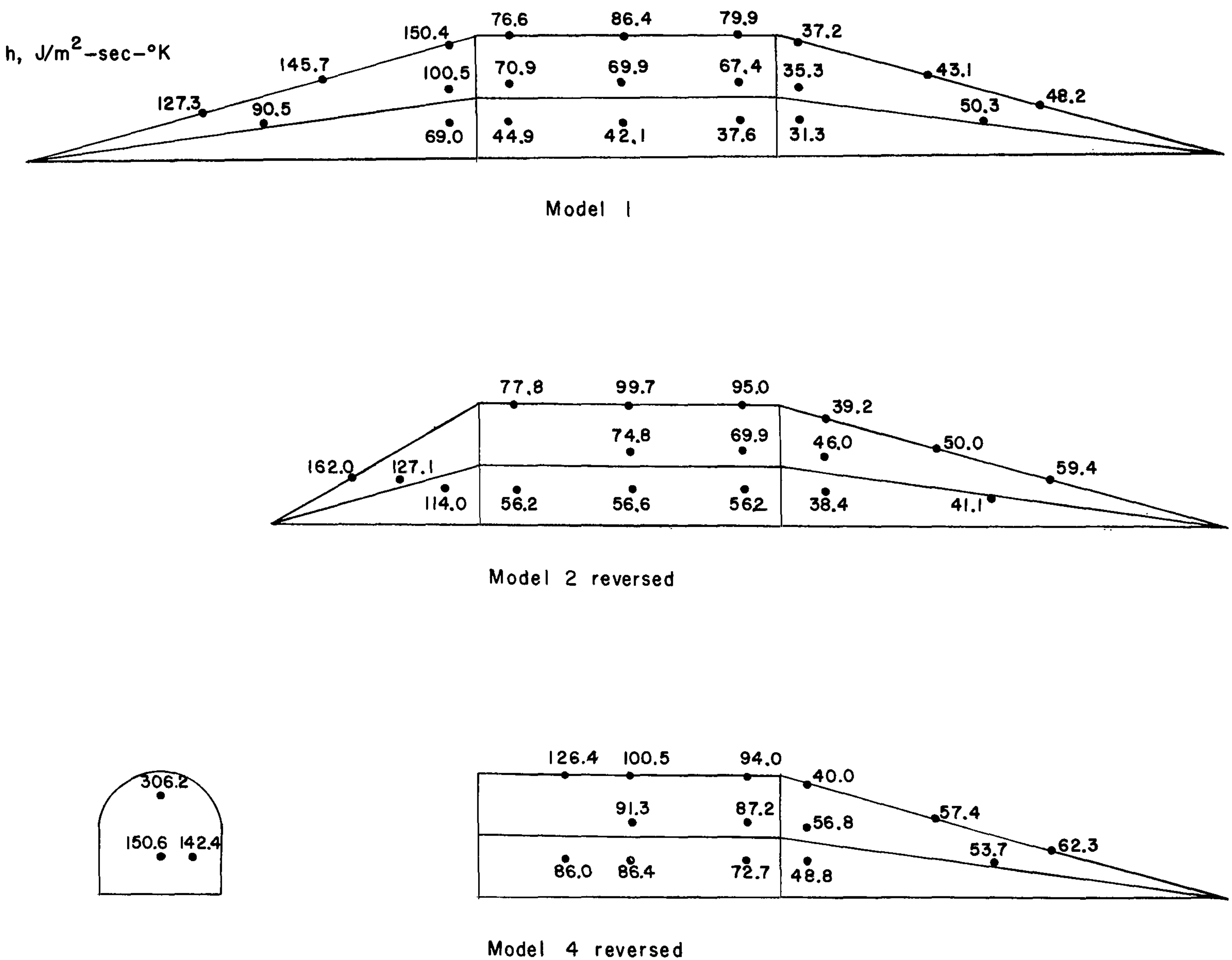


Figure 17.- Spatial plots of model heating distribution. M = 2.49.

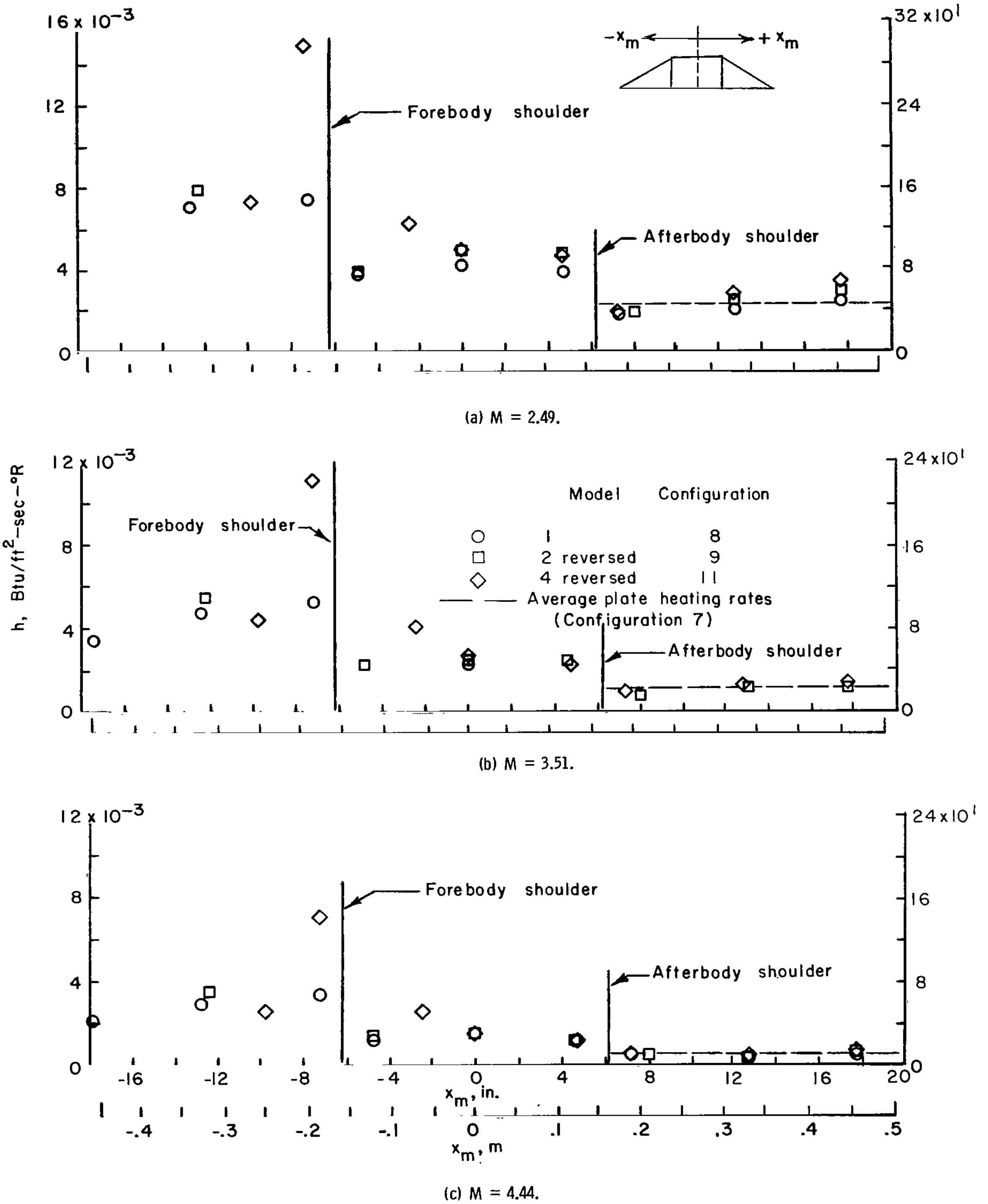
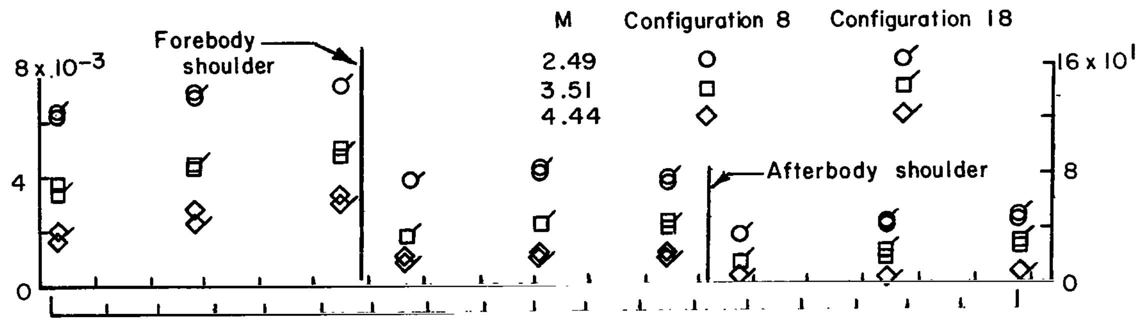
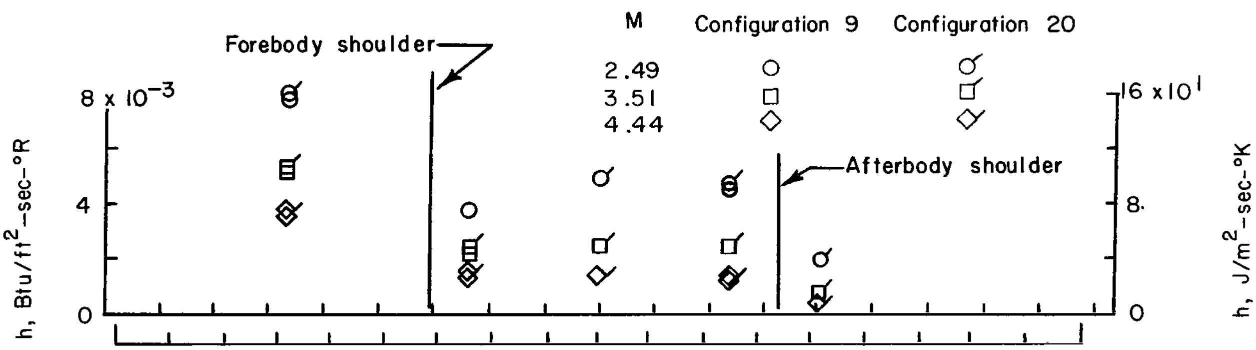


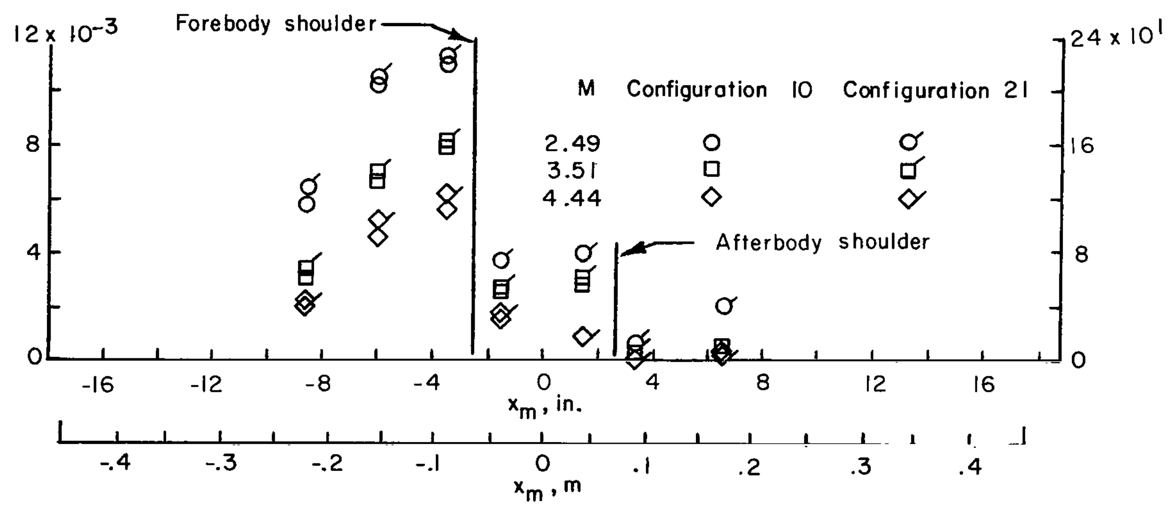
Figure 18.- Effect of model forebody geometry on model heating distribution. y = 0 in.



(a) Model 1.



(b) Model 2 reversed.



(c) Model 3.

Figure 19.- Effect of ramp on model heating distribution.

NASA-Langley, 1966 L-4918

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—NATIONAL AERONAUTICS AND SPACE ACT OF 1958

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